Duck Lake Fire Decision Support Services

Michael Dutter – Science and Operations Officer
Kari Fleegel – IMET/Fire Wx Focal Point
Jason Alumbaugh – Asst. Fire Wx Focal Point
NOAA/NWS Marquette, MI

Great Lakes Operational Meteorology Workshop Webinar Series

April 30, 2013

Duck Lake Decision Support

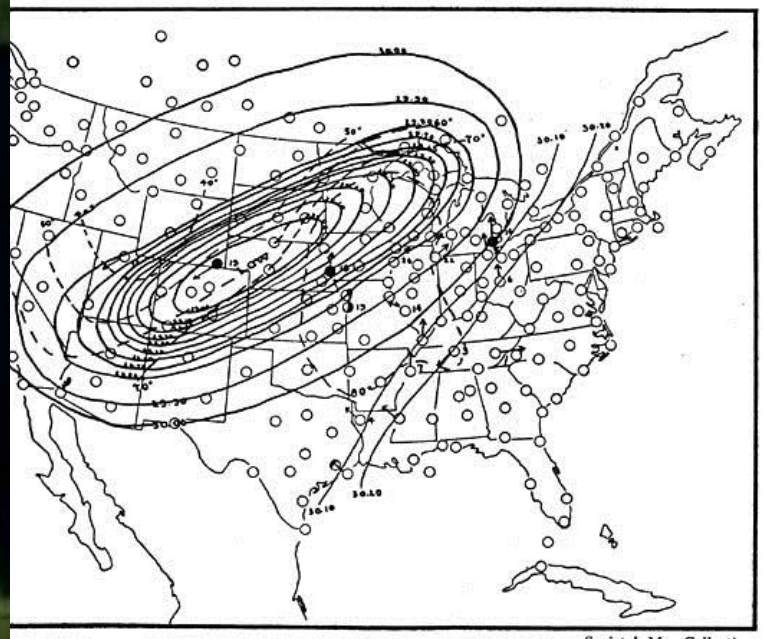
- Largest fires in Michigan modern fire history
  - 1976 Seney 73,300-78,000 acres
  - 1980 Mack Lake 25,000 acres
  - 2012 Duck Lake 21,127 acres
  - 2007 Sleeper Lake 18,500 acres
- Supported fire May 24 – June 21, 2012
- Also supported another smaller, yet significant fire earlier in the week – Pine Creek Fire

We were able to give a high level of support as a result of our years of dedication and perseverance to the Upper Michigan fire program…

Upper Michigan Fire History

October 8, 1871

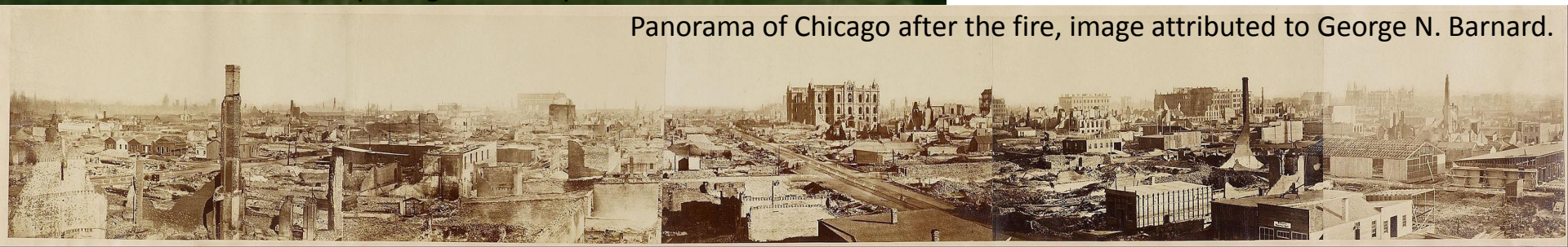
Map image courtesy landmarkhunter.com



Society's Map Collections

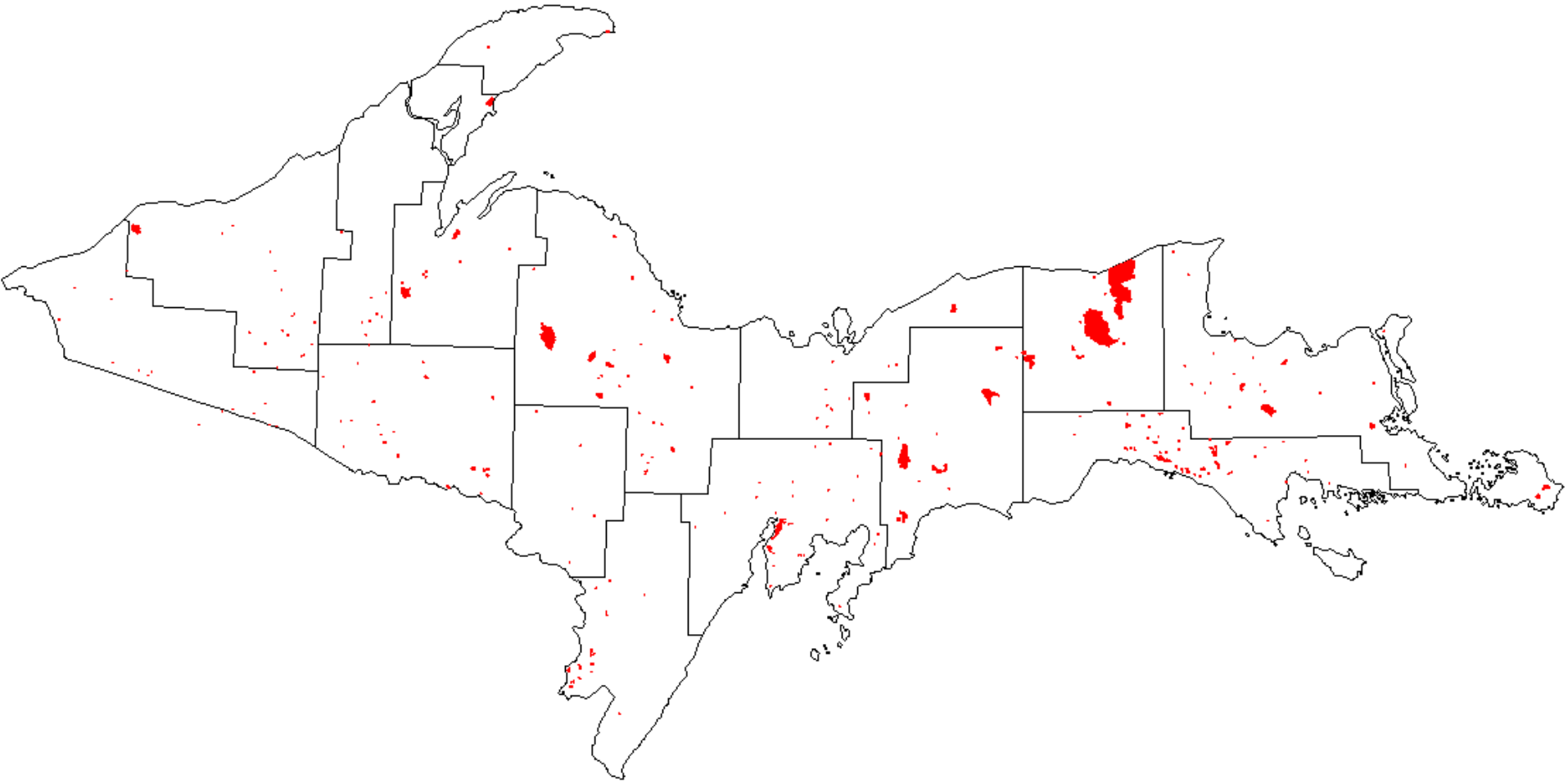
This U.S. Weather Bureau map, prepared from reports made by U.S. Army Signal Service observers at 5:35 P.M. Central Standard time, October 8, 1871, shows the course of the cyclonic storm that prevailed on the day of the Chicago and Peshtigo fires.

Panorama of Chicago after the fire, image attributed to George N. Barnard.



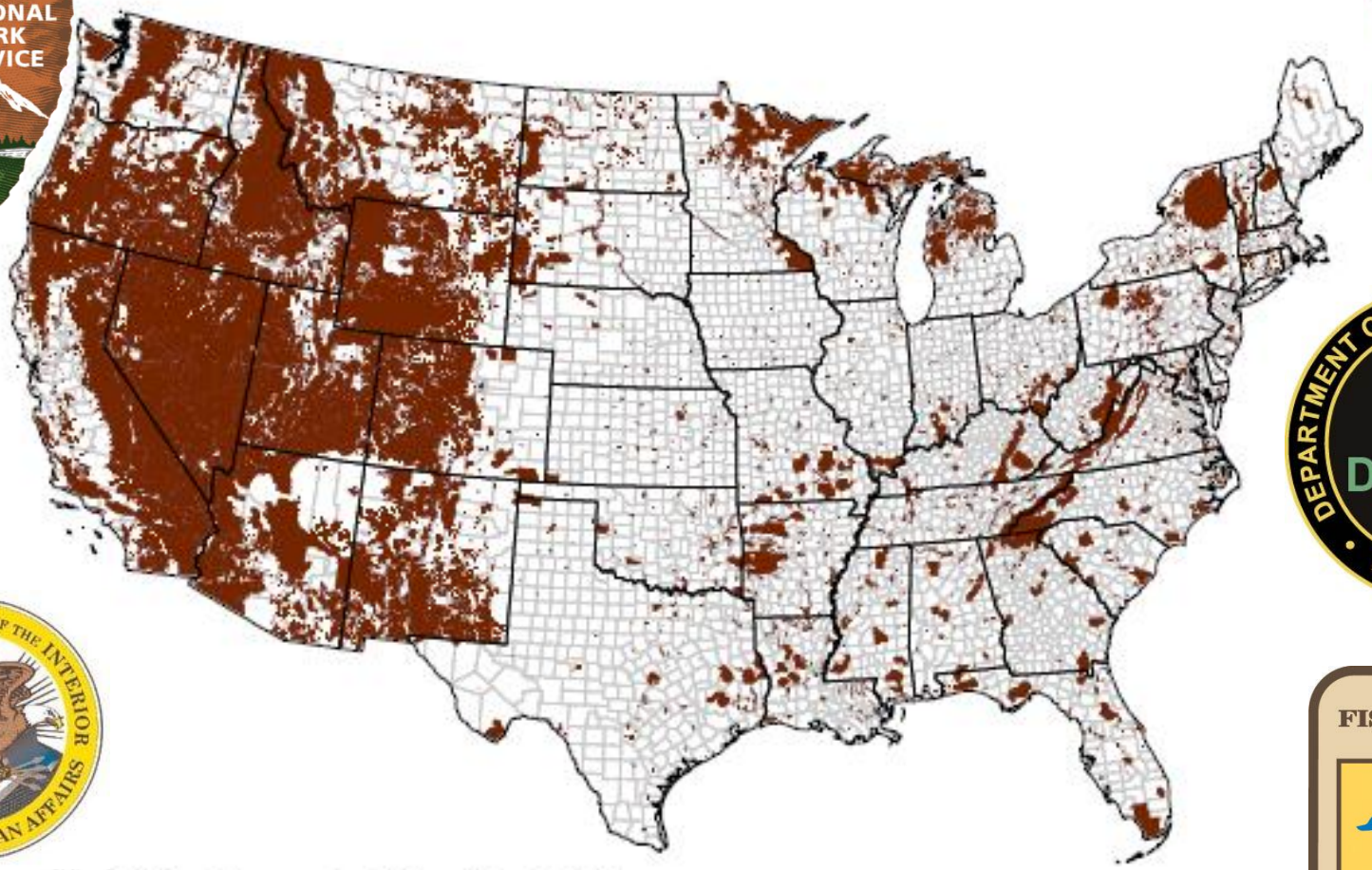
Upper Michigan Fire History

Large Fires since ~1980

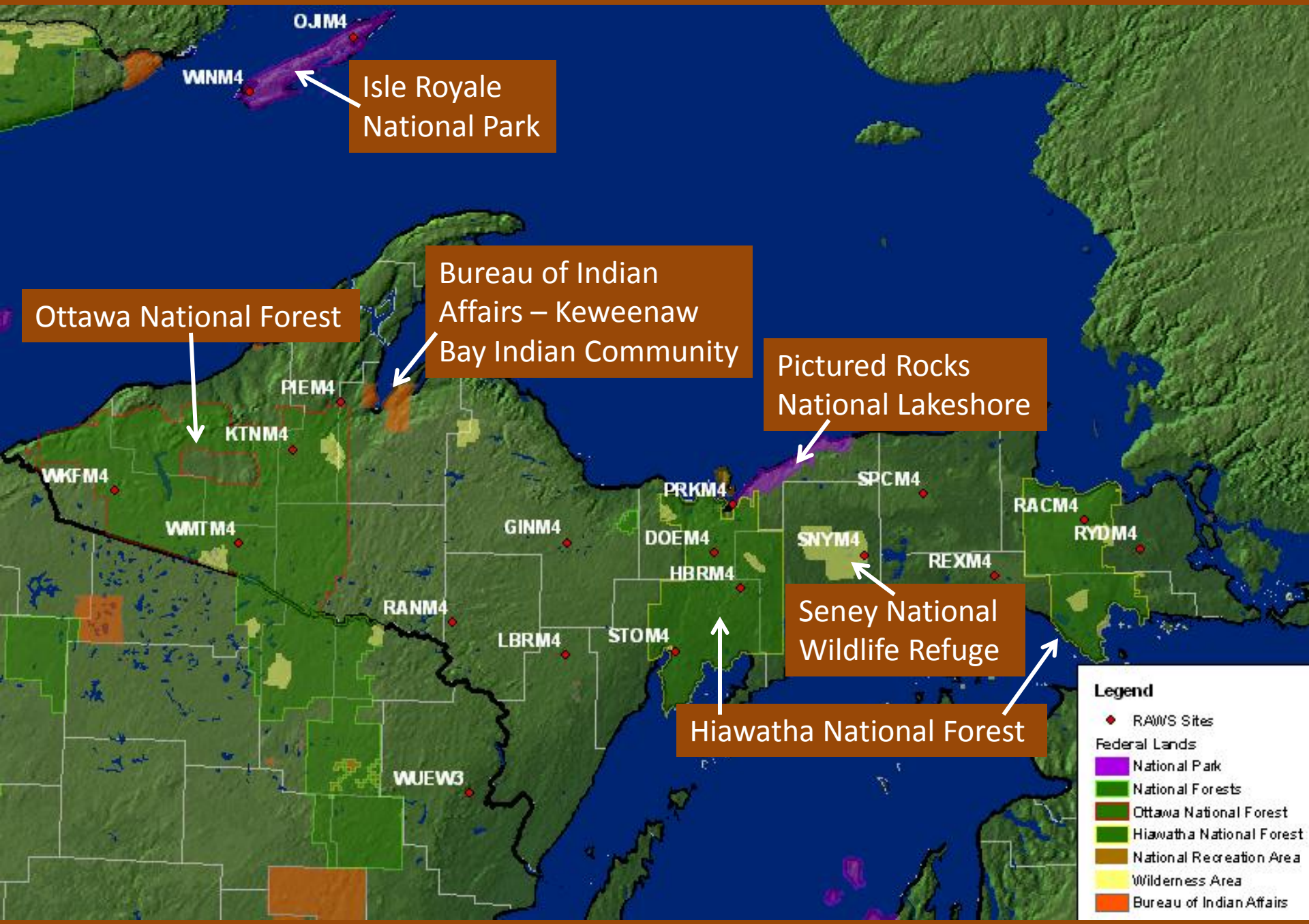


Special thanks to Michigan DNR, Hiawatha and Ottawa National Forests

Federal and State Lands



Map project: Albers equal-area conic projection
Map datum: WGS 84


OJIM4
WNM4
Isle Royale National Park
Bureau of Indian Affairs – Keweenaw Bay Indian Community
Ottawa National Forest
Pictured Rocks National Lakeshore
PIEM4
KTNM4
WKFM4
WMTM4
GINM4
PRKM4
SPCM4
RACM4
RYDM4
DOEM4
SNYM4
REXM4
HBRM4
RANM4
LBRM4
STOM4
Seney National Wildlife Refuge
Hiawatha National Forest
WUEW3
Legend
RAWS Sites
Federal Lands
National Park
National Forests
Ottawa National Forest
Hiawatha National Forest
National Recreation Area
Wilderness Area
Bureau of Indian Affairs

Interagency Coordination

Michigan Interagency Wildland Fire Protection Association

- Spring refresher and fall wrap-up meetings
  - Additional spring weather-centric meeting hosted at NWS Marquette
  - Teach at annual refresher meetings throughout Upper Michigan (average 150 firefighters annually since 2010)

MICHIGAN Interagency Wildland Fire Protection Association

Interagency Coordination
Continued Coordination

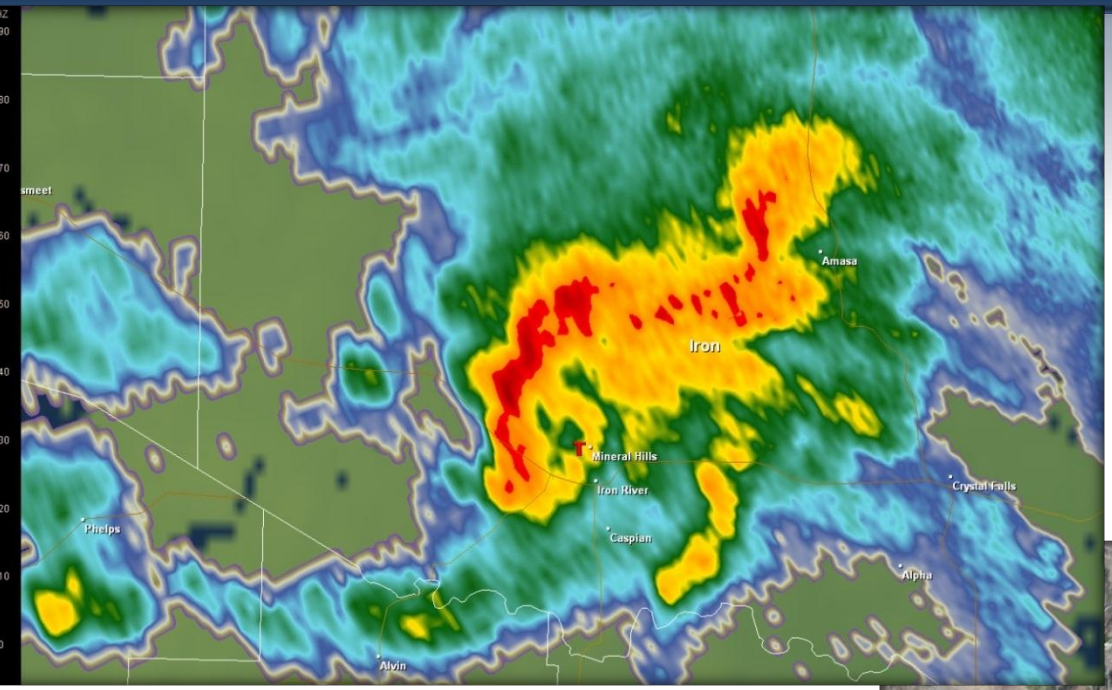
- Weekly conference calls – Thursday morning

- Emails sent to heads of each agency, to highlight upcoming weather that may lead to fire concerns

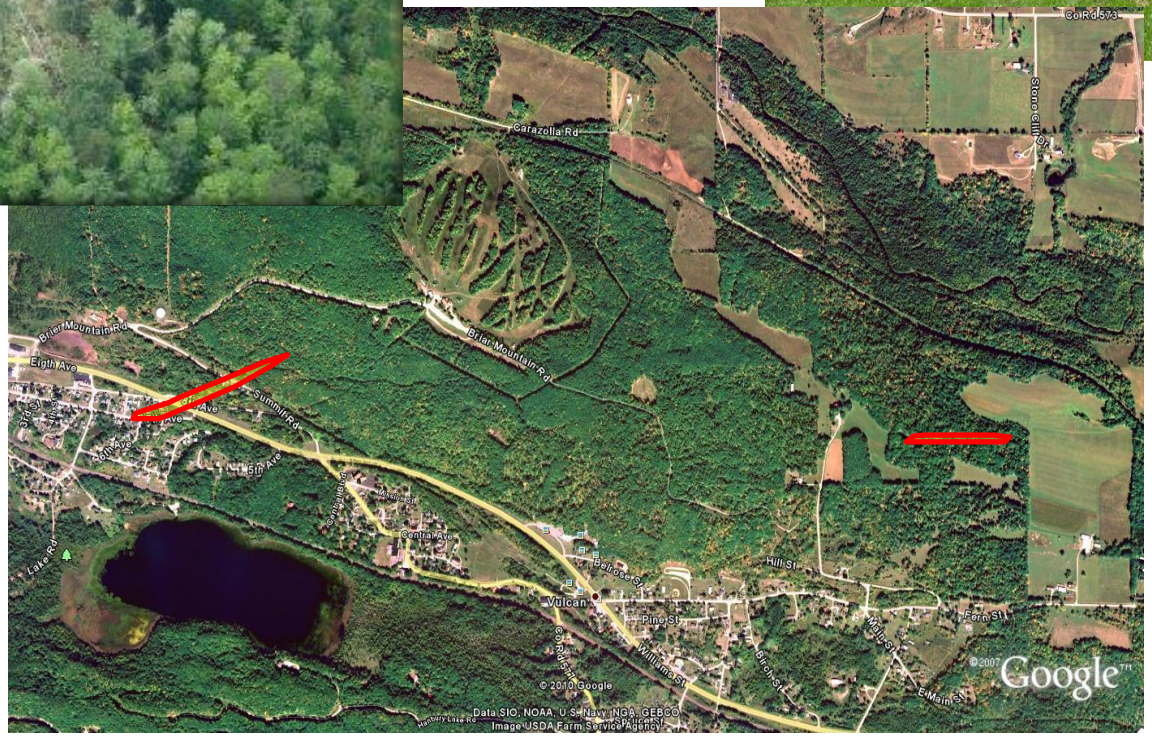
Other Outreach
Significant Prescribed Burn Visits

- Bureau of Indian Affairs 1st prescribed burn, 2009
- Seney National Wildlife Refuge burn, 2010
  - Incident Meteorologist dispatch practice
  - Taught 30+ elementary school students
- 3 attended in 2011 (~7 different forecasters)

Storm Survey Assistance
April 30, 2010 Tornado – Iron County

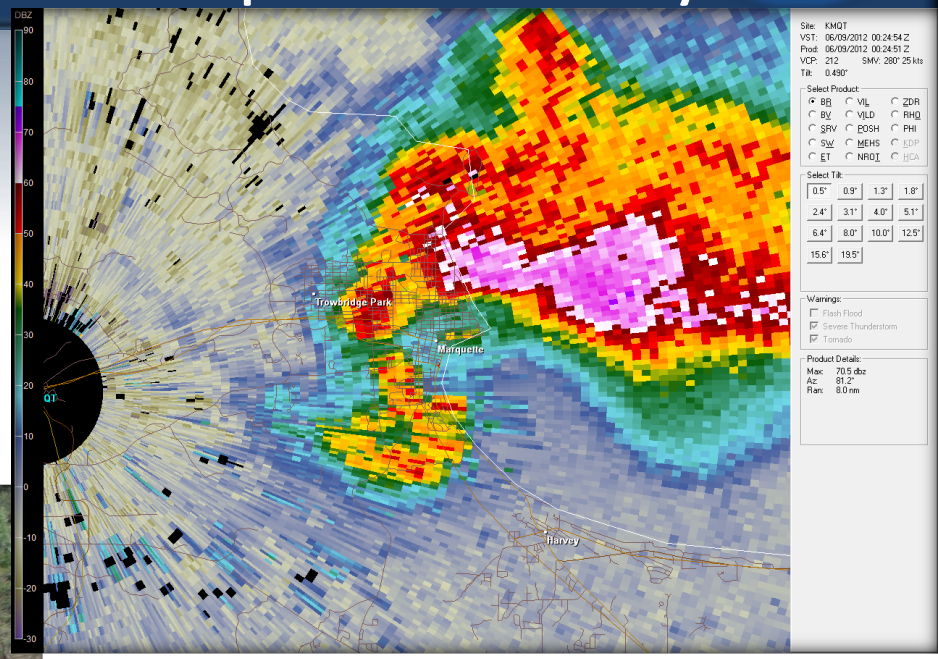


Storm Survey Assistance
July 27, 2010 Tornado – Dickinson County



Storm Survey Assistance

June 8, 2012 Tornado – Marquette County



Internal Refresher Training

- Past season, and potential improvements
- Coordination
  - Phone, email, 800MHz radio
  - Web conferencing
  - DSS webpage
- Spot Forecasts
  - Creating a useful discussion (uncertainty)
  - Editing
  - Create new/reccuring Spot request
- Critical Upper Michigan watch-outs and weather patterns…

Upper Michigan Watch-Outs

Red Flag Warning conditions:

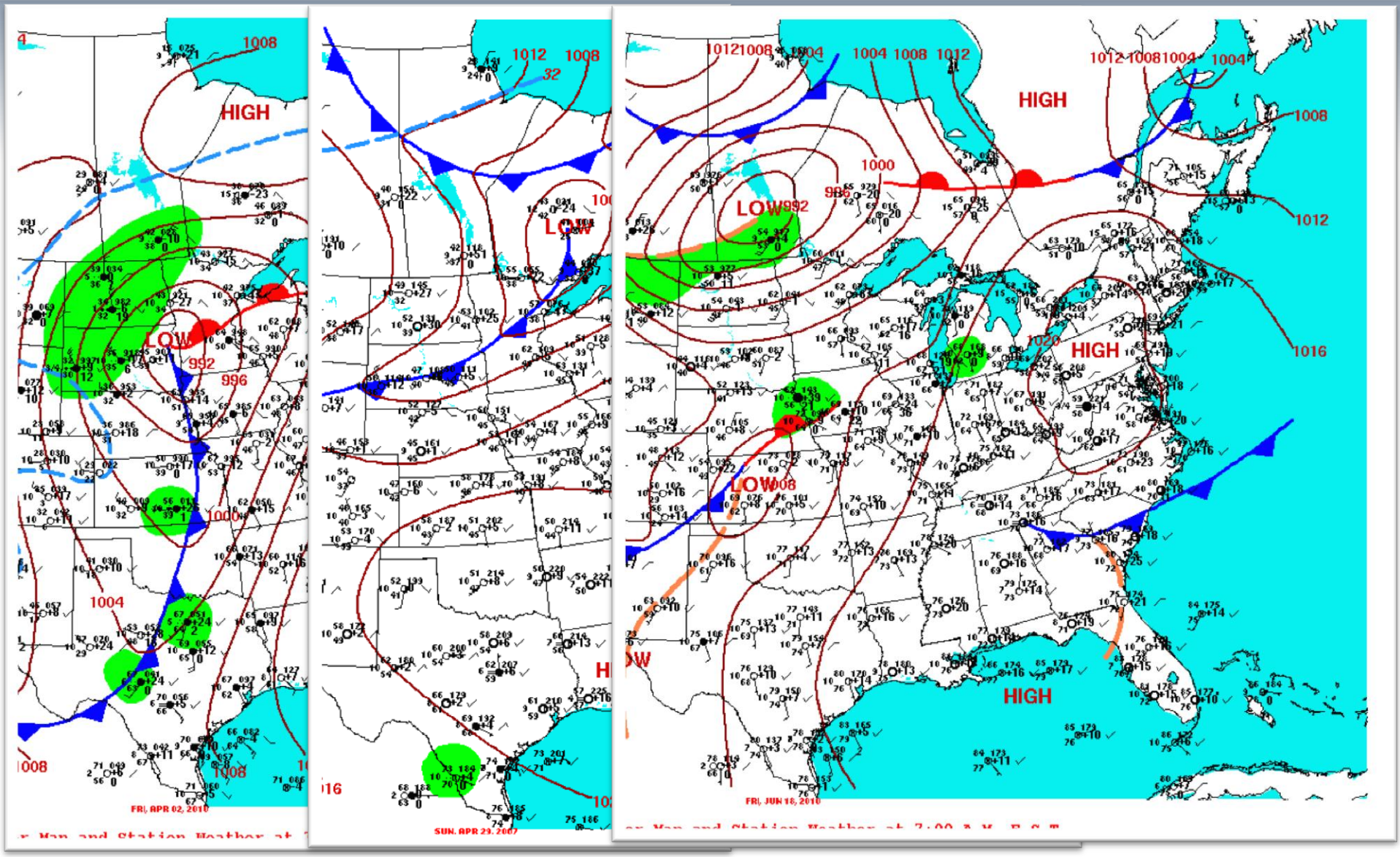
- **Dry spell** for over a week, or less before spring green-up (fuels coordinated with cooperating agencies)
- Relative Humidity ≤ **25%**
- Temperature ≥ **70°F** (soft criteria - may be lower)
- Sustained winds…
  - RAWS (~20 ft tower height) ≥ **15 mph**
  - ASOS (33 ft tower height) ≥ **20 mph**

** may issue ***Wildfire Potential Statement*** for near Red Flag Warning conditions**

Upper Michigan Watch-Outs

- **Temperatures**
  - Temperatures greater than 20°F above normal
  - Persistence of this temperature trend for a couple days or more
- **Dryness**
  - Pre green-up dry spell lasting longer than a week
  - Prolonged period of hot and dry conditions in summer – "Shorter term drought"
- **Humidity and Winds**
  - Minimum Relative Humidity less than 25% (or even 35%)
  - Poor nighttime Relative Humidity recovery, less than 90%
  - Gusty gradient winds

Critical Weather Patterns



Duck Lake Fire – 24 May-June 2012

Event Overview

Event Overview: Duck Lake

- One of the largest fires in MI modern fire history
  - 1976 Seney 73,300-78,000 acres
  - 1980 Mack Lake 25,000
  - 2013 Duck Lake 21,127
  - 2007 Sleeper Lake 18,500 acres

  …

  before modern history

  1871 Peshtigo 1.5mil acres

  1881 Thumb 1mil acres

  …

  2009 Pinery 685 acres

  2009 Black River Falls 806 acres

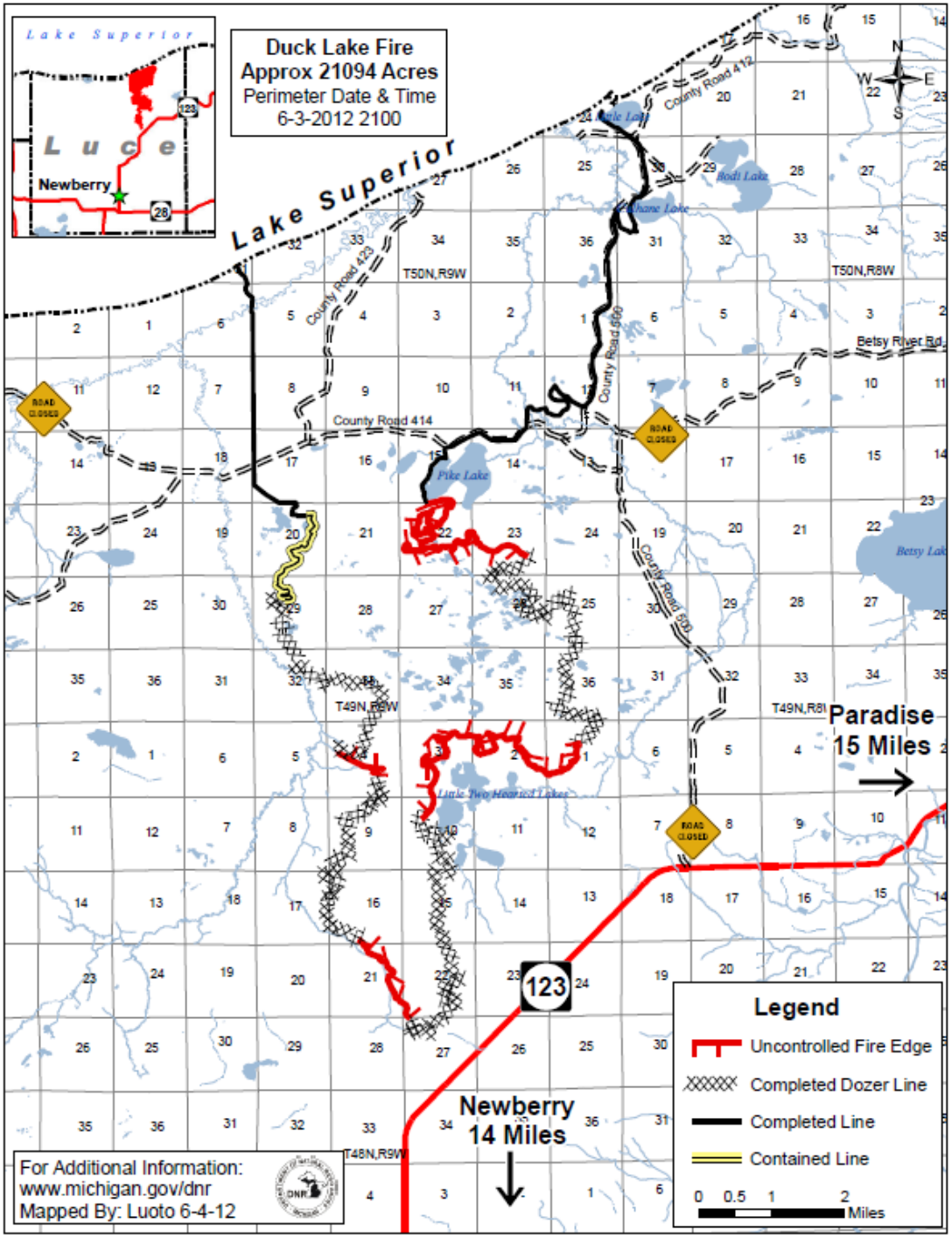
- 21,127 acres
- Suppression Cost: $2.7 mil

Courtesy WLUC TV6

Event Overview: Duck Lake

- Fire developed in a region of Jack Pine
- Likely a fire ignited by lightning strike from May 21
  - Smoldered until May 24 when south winds increased ahead of a cold front

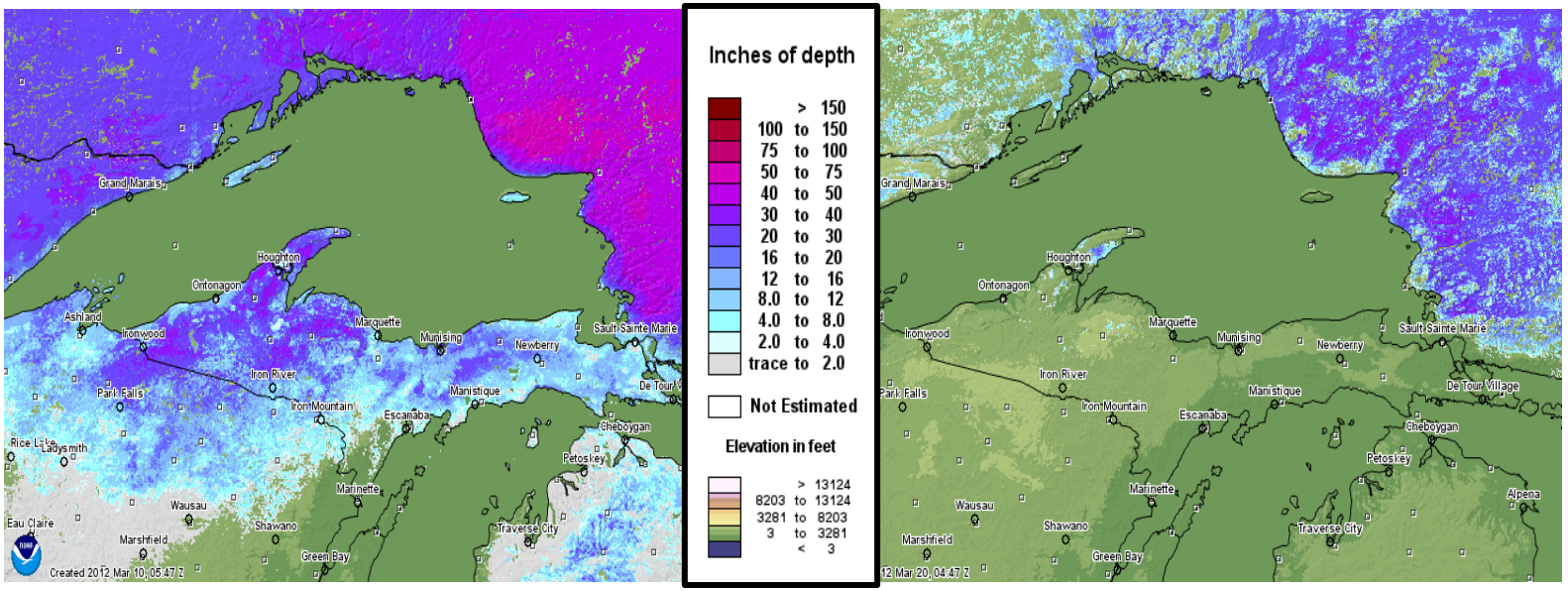
Rainbow Lodge Two Heart


Lake Superior
Luce
Newberry
123
28
Duck Lake Fire
Approx 21094 Acres
Perimeter Date & Time
6-3-2012 2100
Lake Superior
T50N,R9W
T50N,R8W
T49N,R9W
T49N,R8W
T48N,R9W
County Road 412
County Road 425
County Road 414
County Road 500
Betsy River Rd
Pike Lake
Little Two Hearted Lake
Betsy Lake
ROAD CLOSED
ROAD CLOSED
ROAD CLOSED
Paradise
15 Miles
Newberry
14 Miles
123
Legend
Uncontrolled Fire Edge
Completed Dozer Line
Completed Line
Contained Line
0 0.5 1 2
Miles
For Additional Information:
www.michigan.gov/dnr
Mapped By: Luoto 6-4-12
DNR

Meteorology leading up to the Duck Lake Fire

Overview

Very early start to fire season as snow cover vanishes…

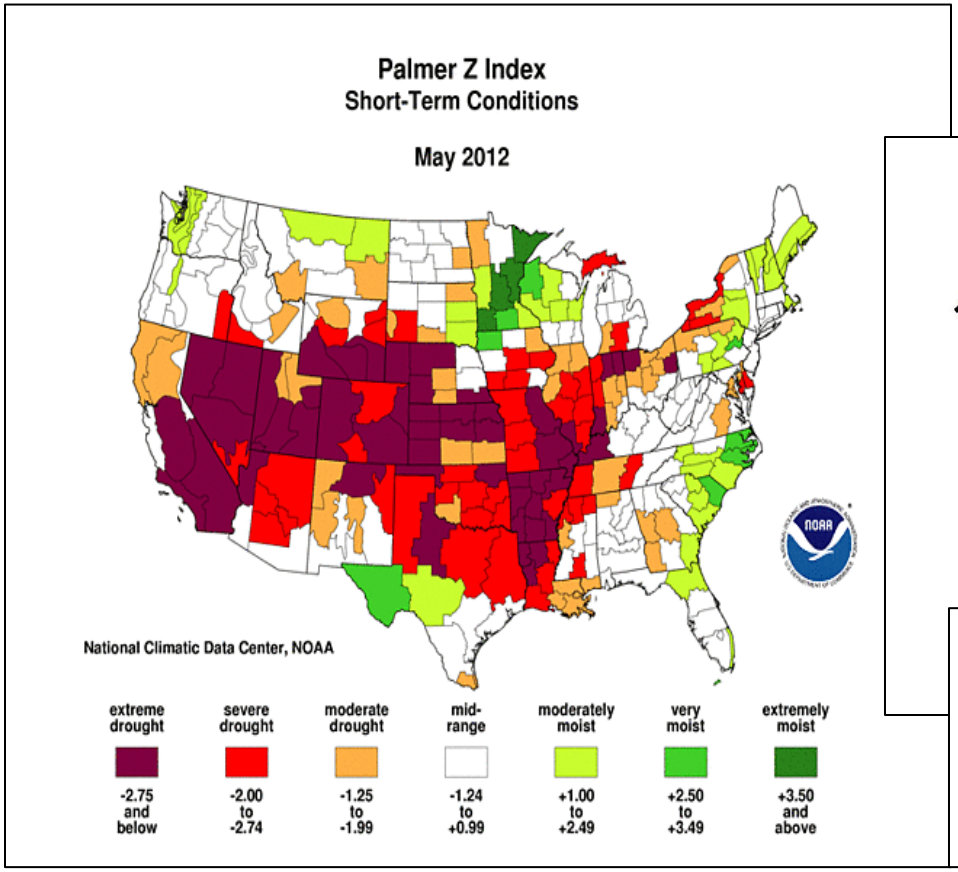


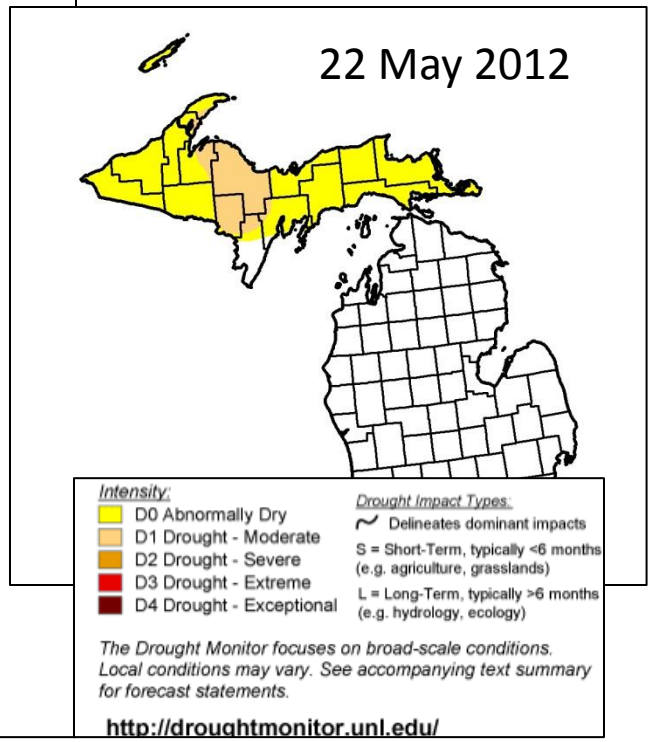
10 March 2012

20 March 2012

Overview

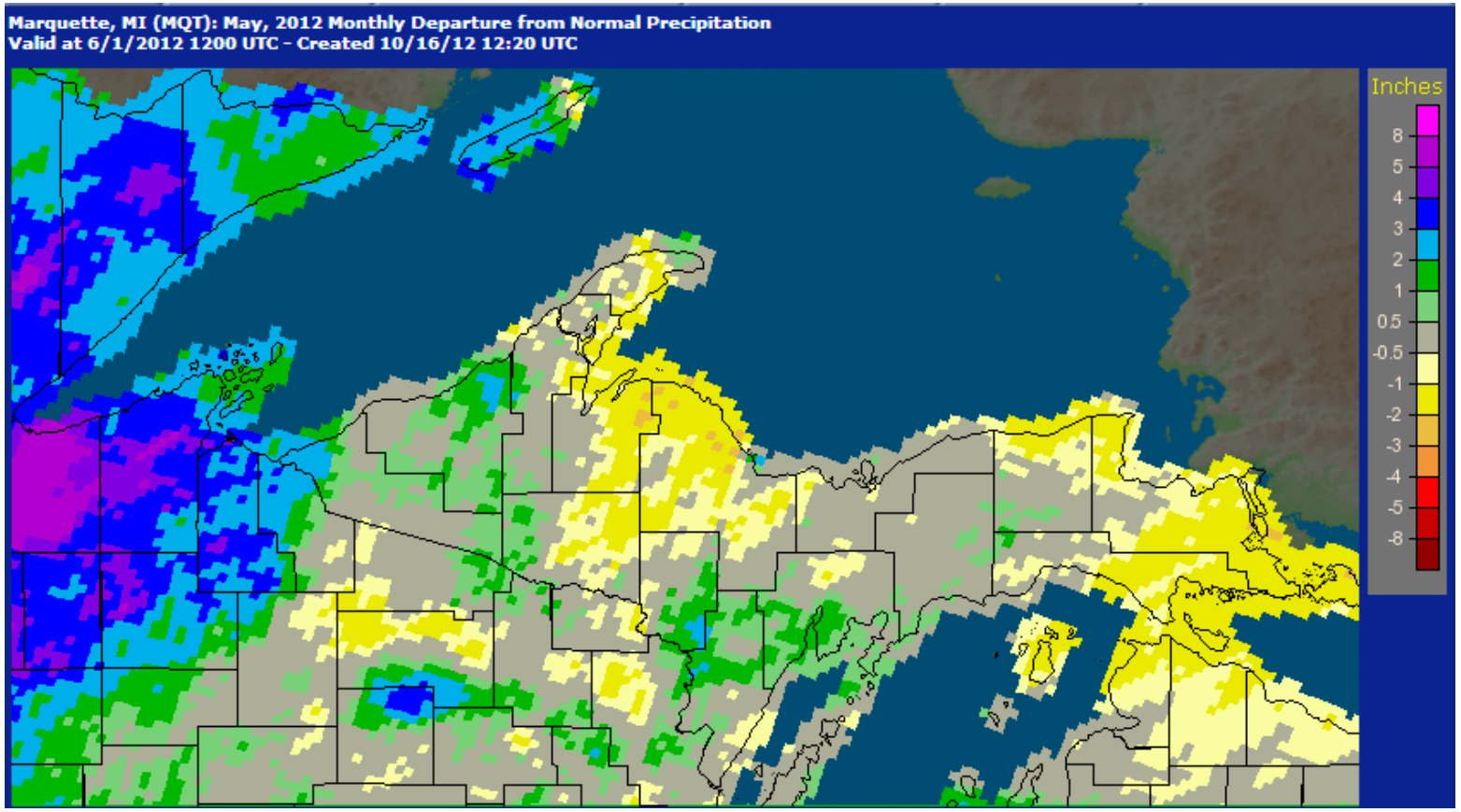
Long term dryness combines with dry spring





Overview

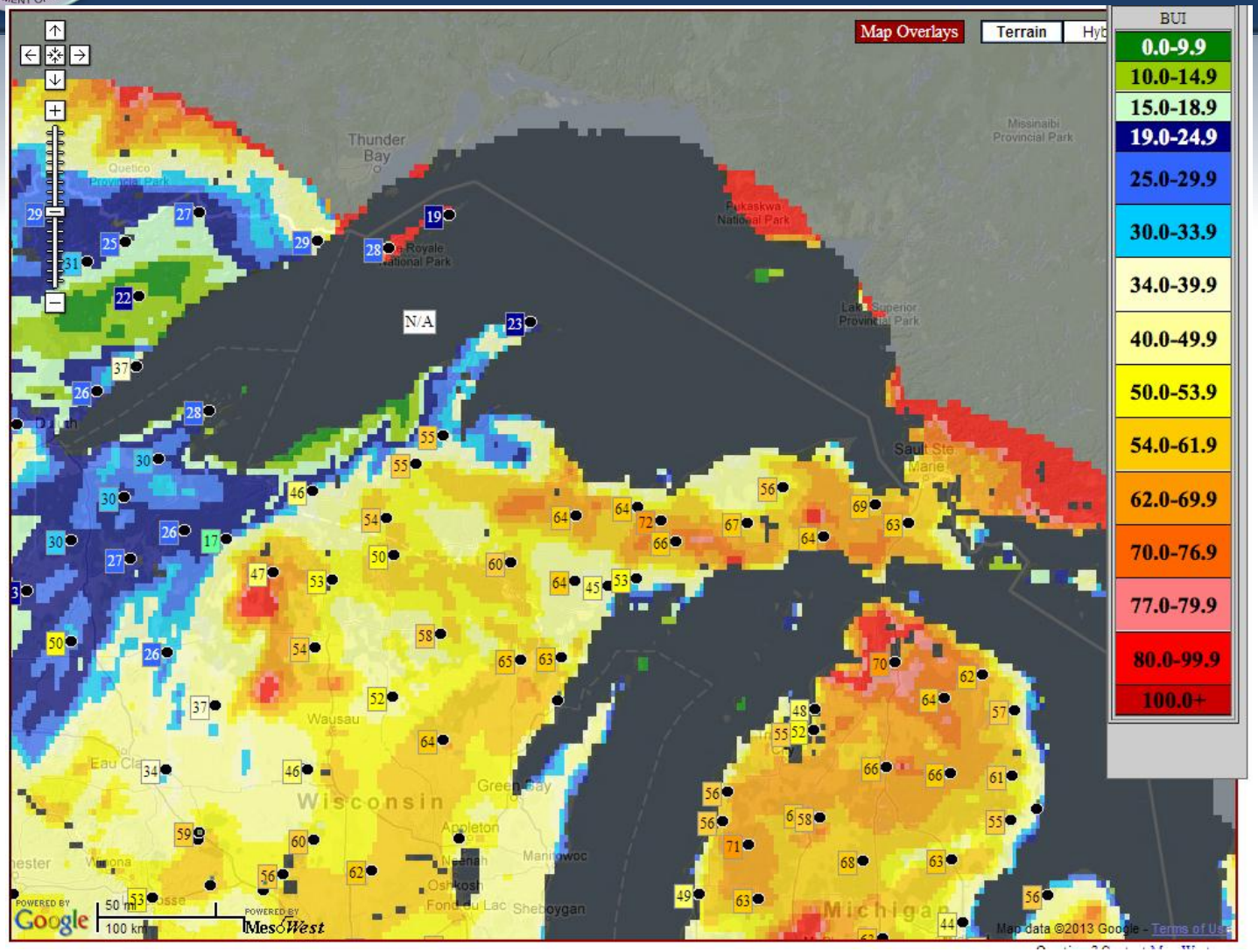
Long term dryness combines with dry spring



Extent of Dryness

- Canadian Forest Fire Danger Rating System (CFDFRS)
  - Duff Moisture Code (DMC)
    - Rainfall, Relative Humidity and Temperature
  - Buildup Index (BUI)
    - Duff Moisture Code and Drought Code

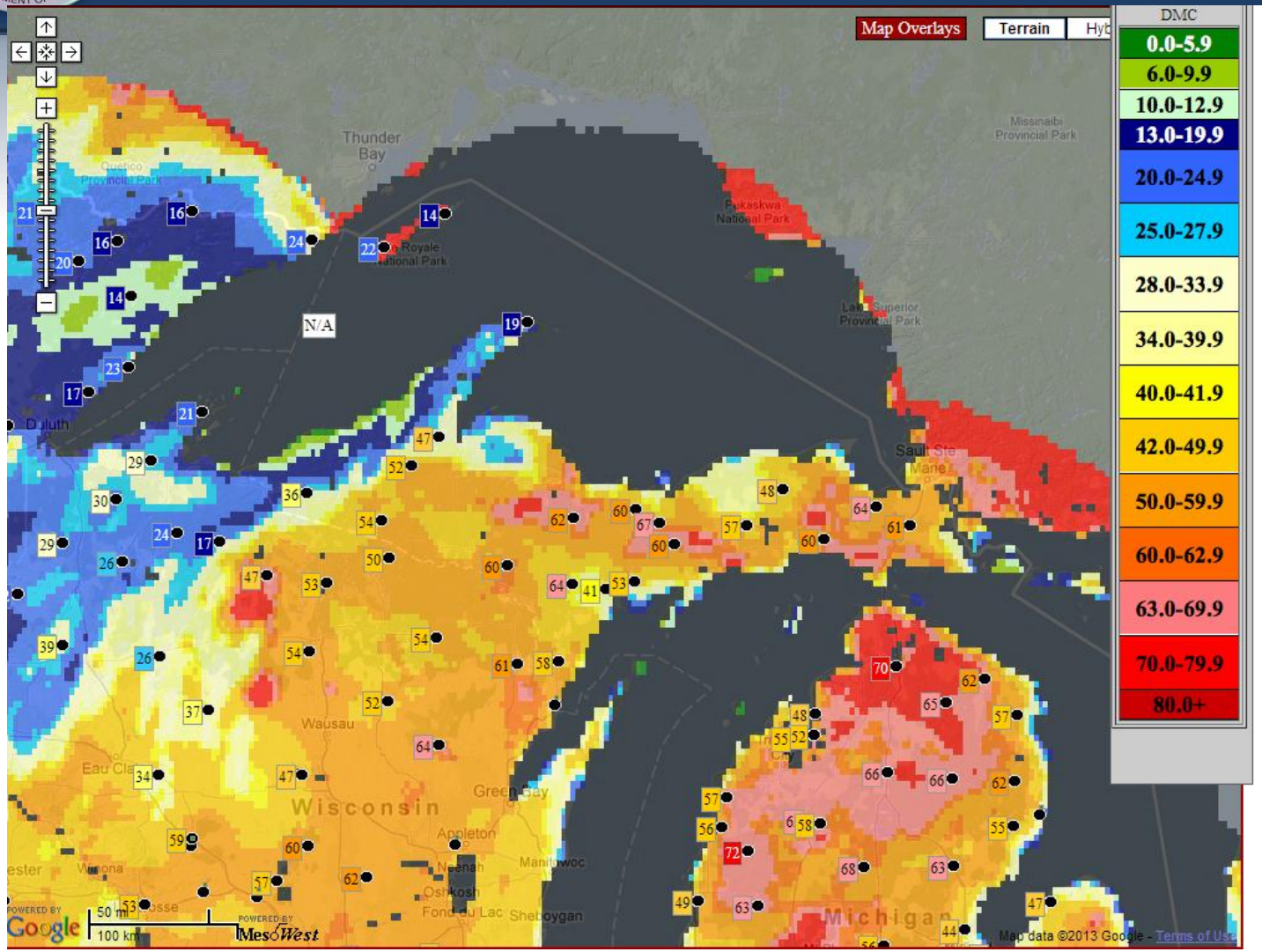
- Great Lakes Fires and Fuels page



BUI

Buildup Index

20 May 2012

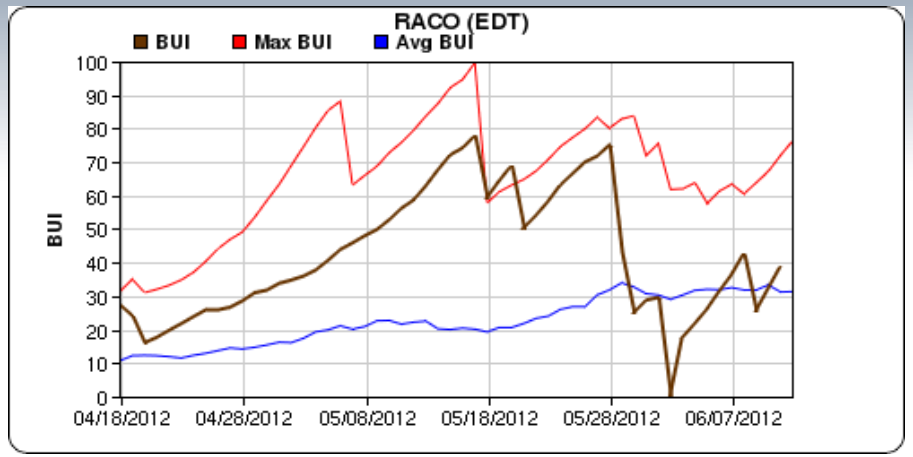


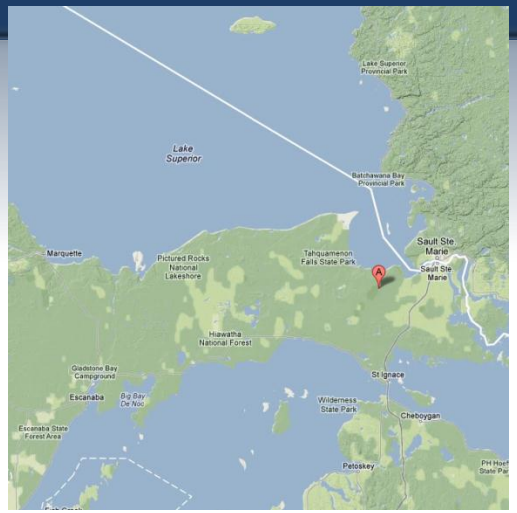
DMC

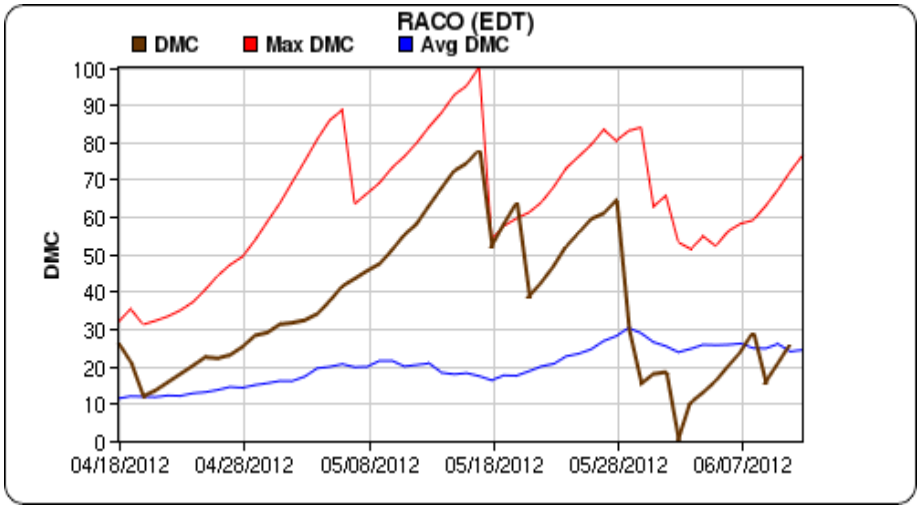
Duff Moisture Code

20 May 2012

Raco RAWS station BUI and DMC





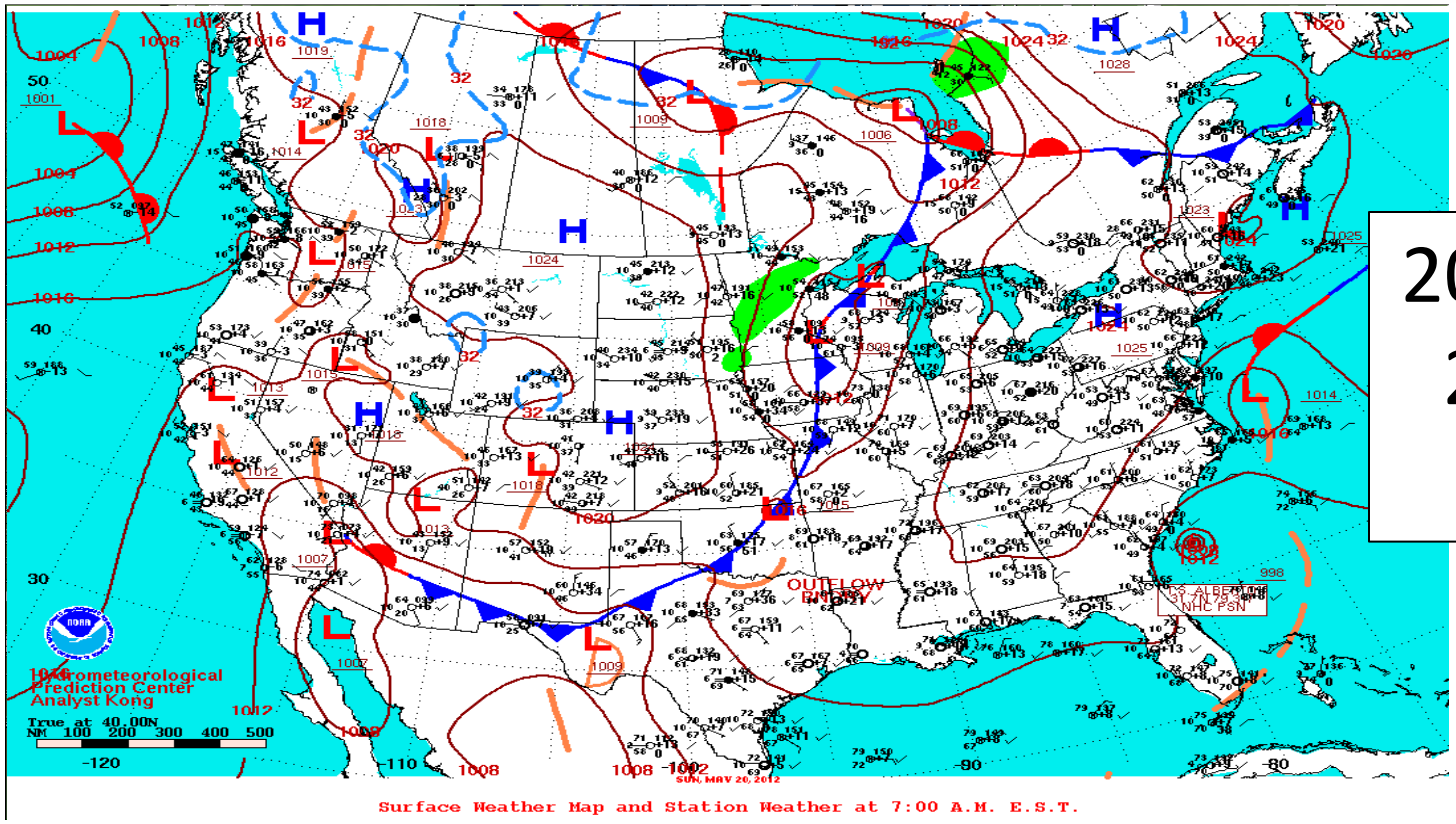


BUIs and DMCs

- Very High to Extreme by Mid May 2012
- Increased probability of Lightning fire starts
- Over half of fires mid May through late May caused by lightning

Overview

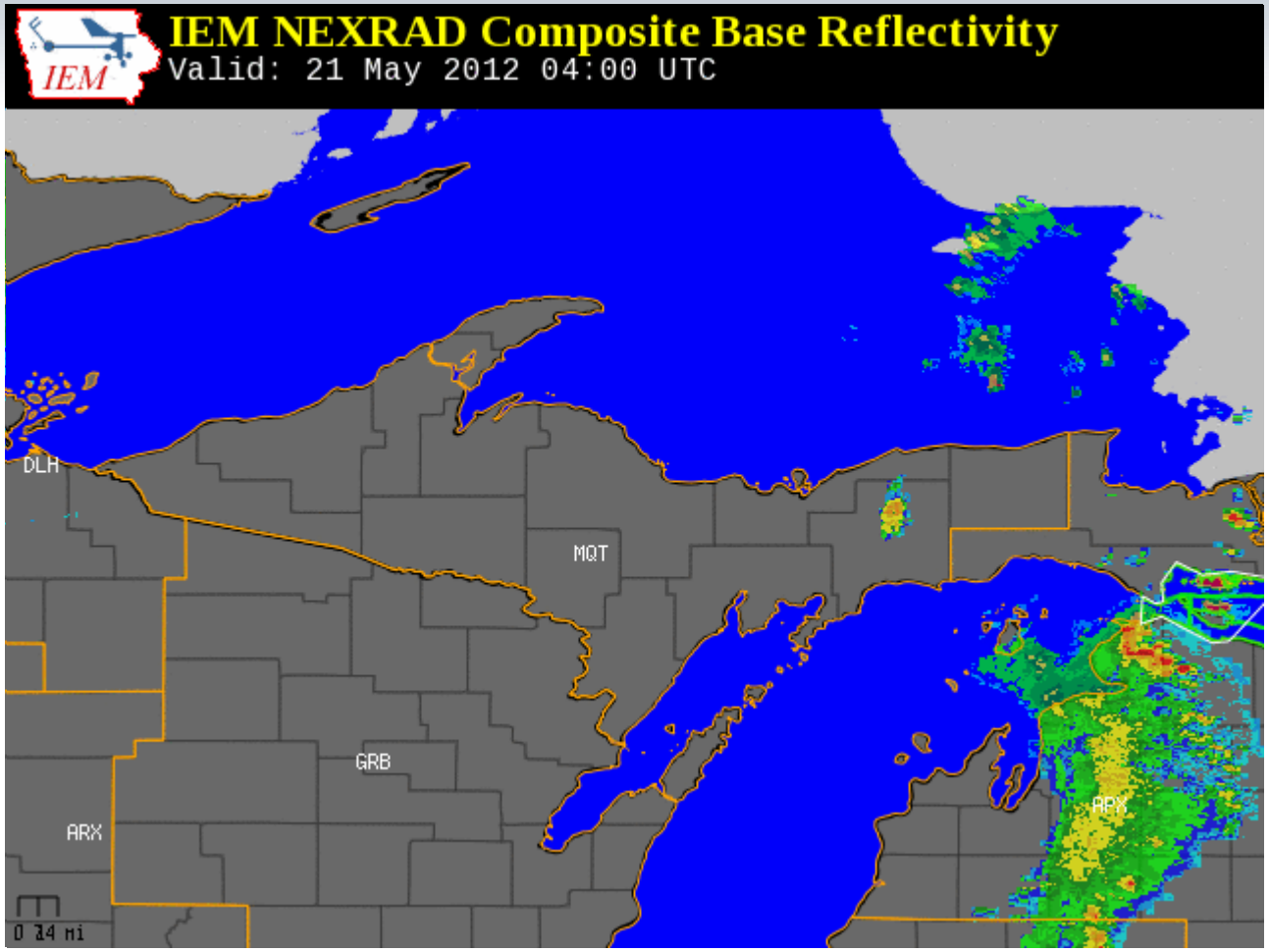
- Cold front moves over Upper Michigan



20 May
2012
12z

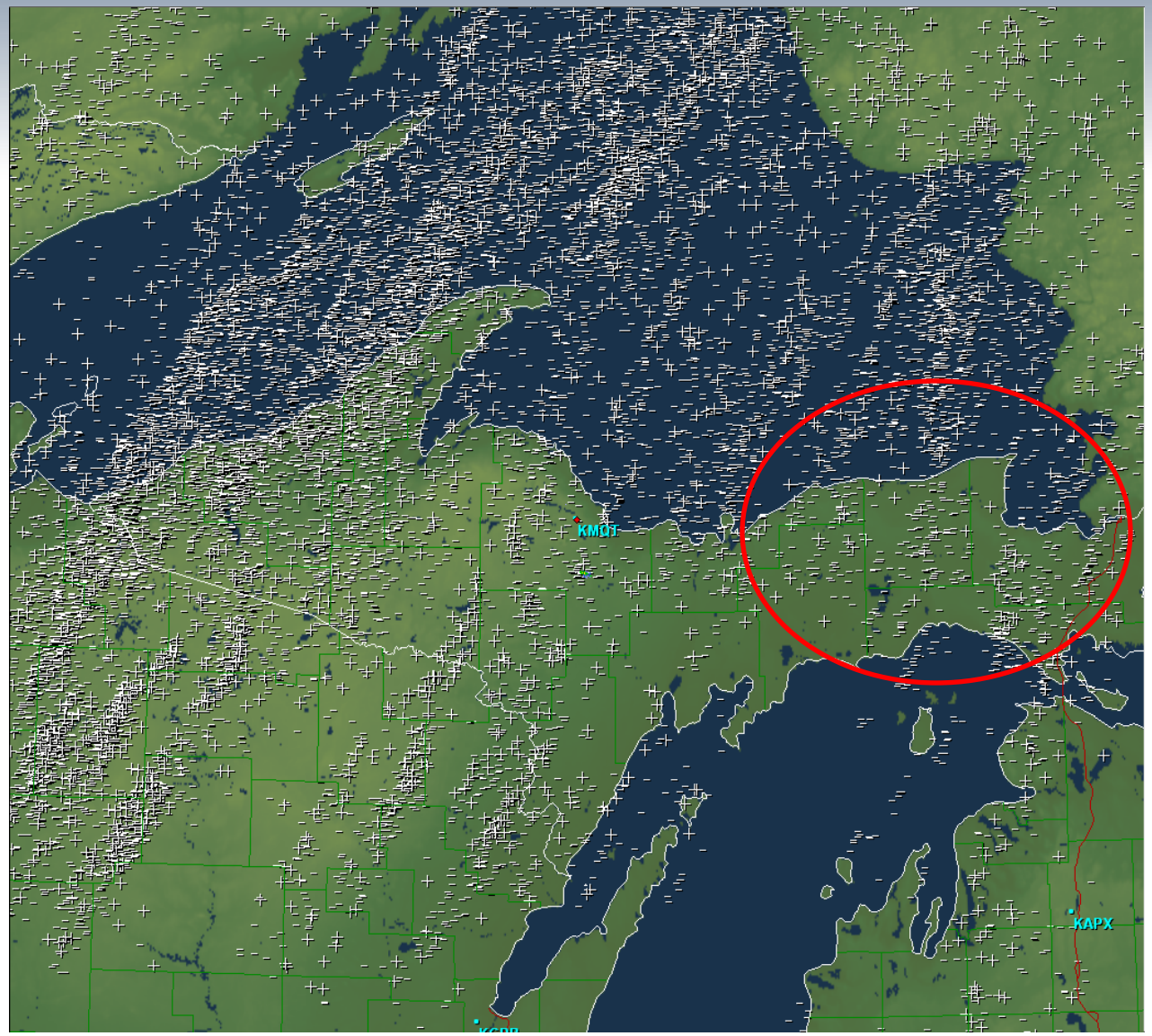
20/21 May 2012

Radar Loop 18 UTC – 04 UTC



20/21 May 2012

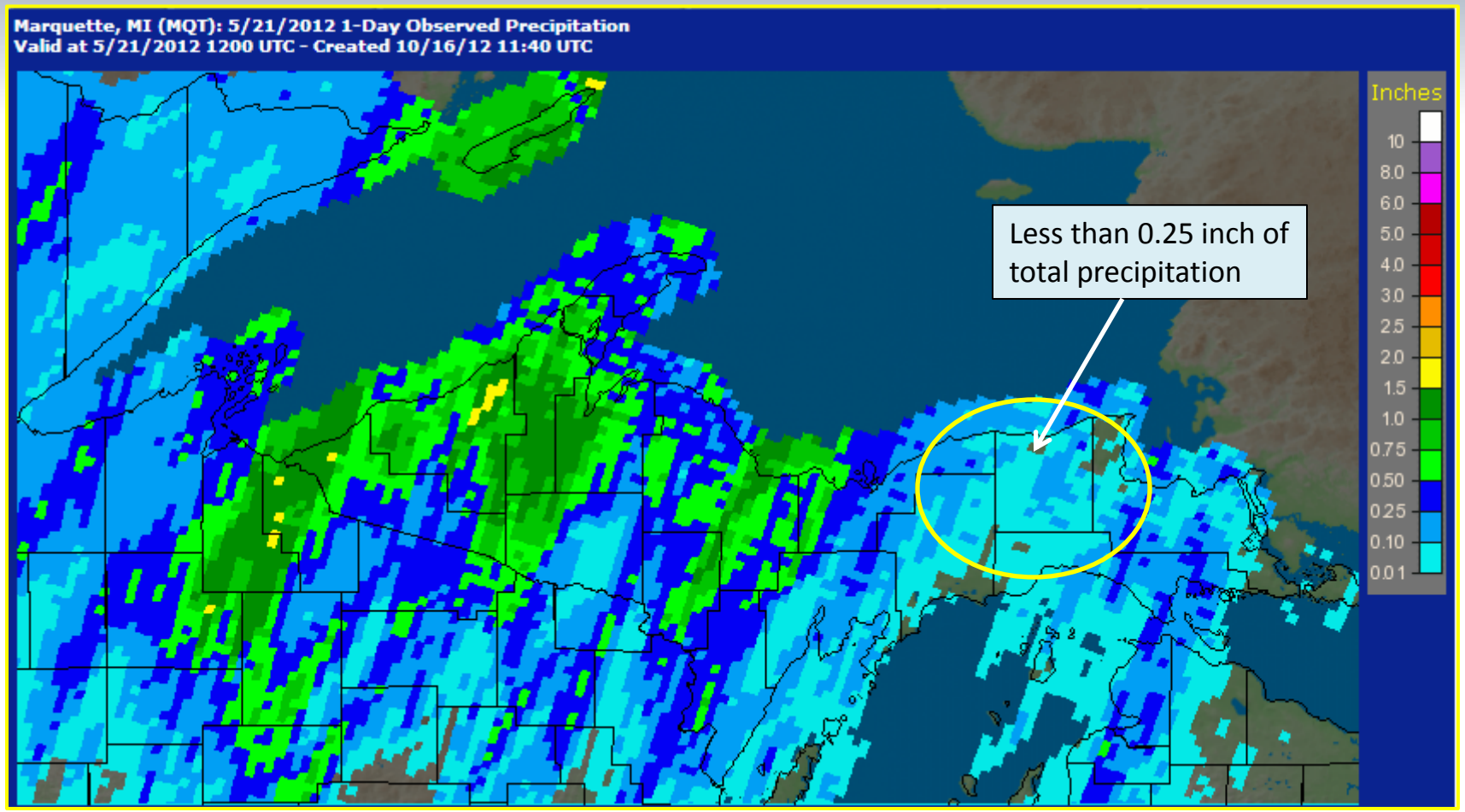
Total Cloud to Ground Lightning Strikes



Note the numerous strikes over eastern Upper Michigan

20/21 May 2012

Observed Precipitation



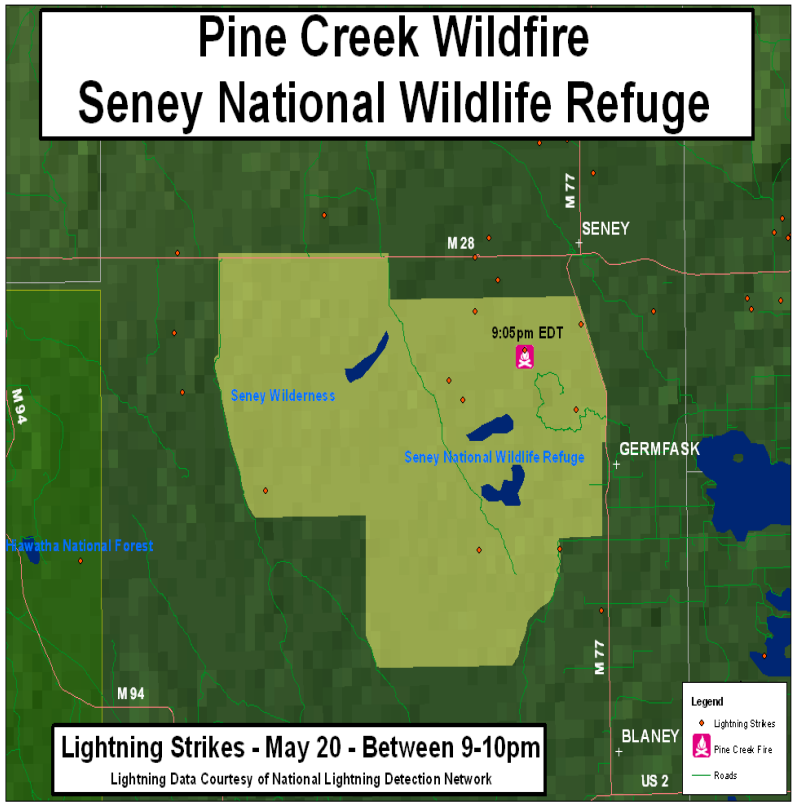
Overview

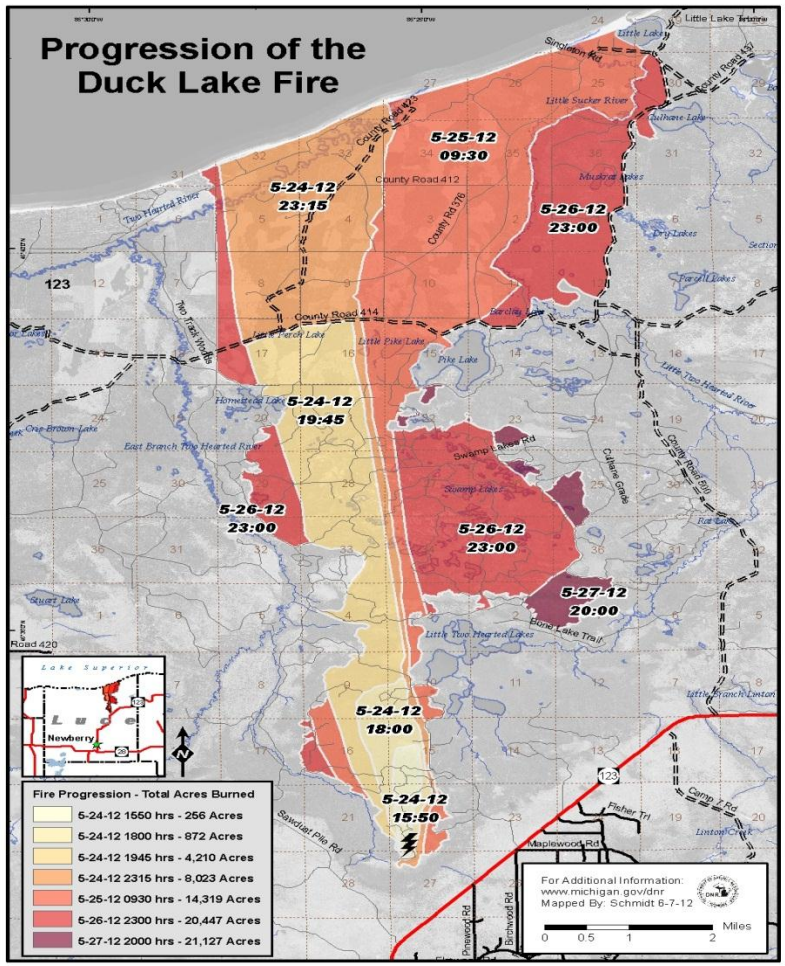
Lightning with limited rainfall starts fires

- Pine Creek fire at Seney National Wildlife Refuge
- Duck Lake fire in northern Luce County

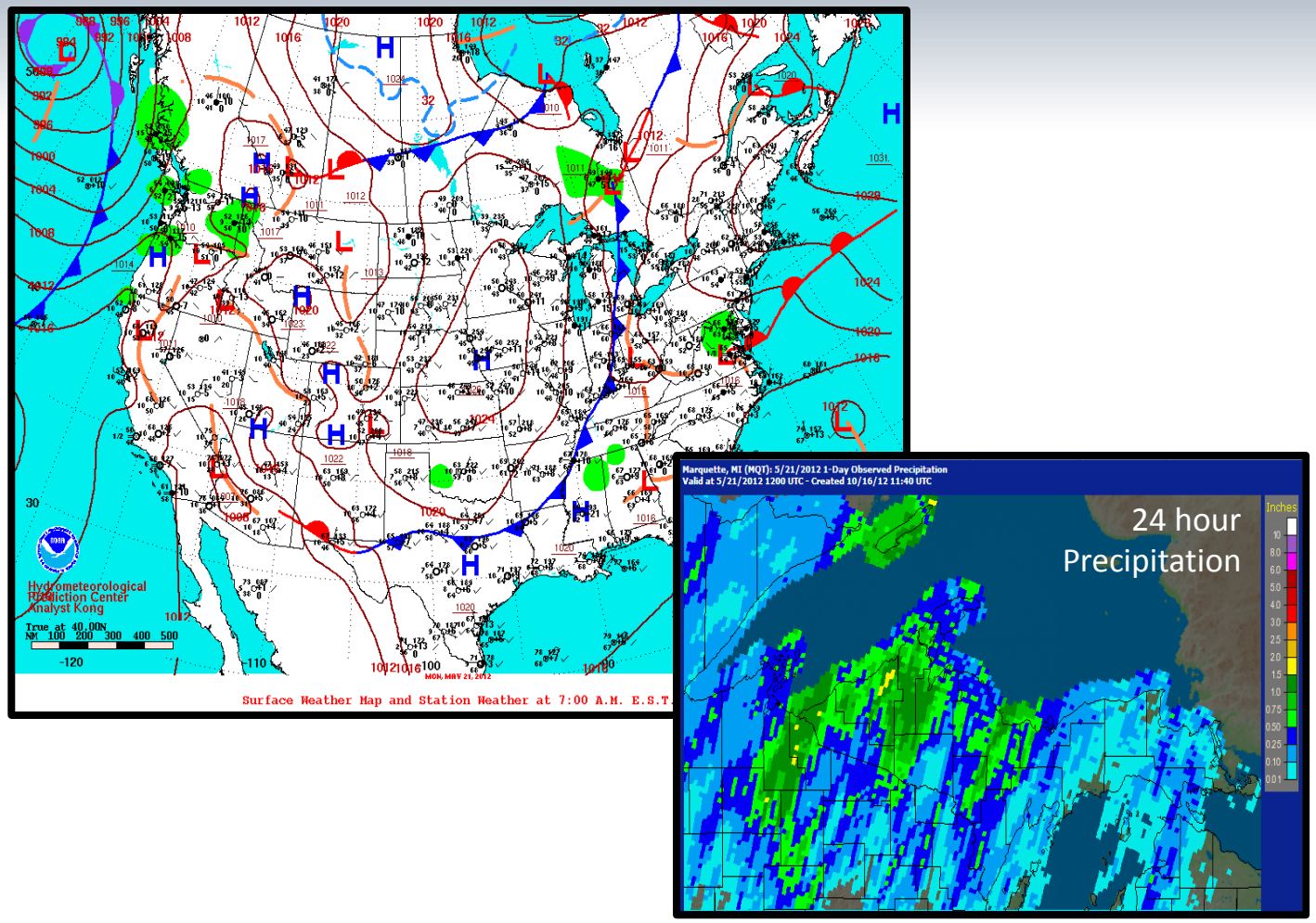
Overview

Lightning with minimal rainfall starts fires at Seney National Wildlife Refuge and in Luce County



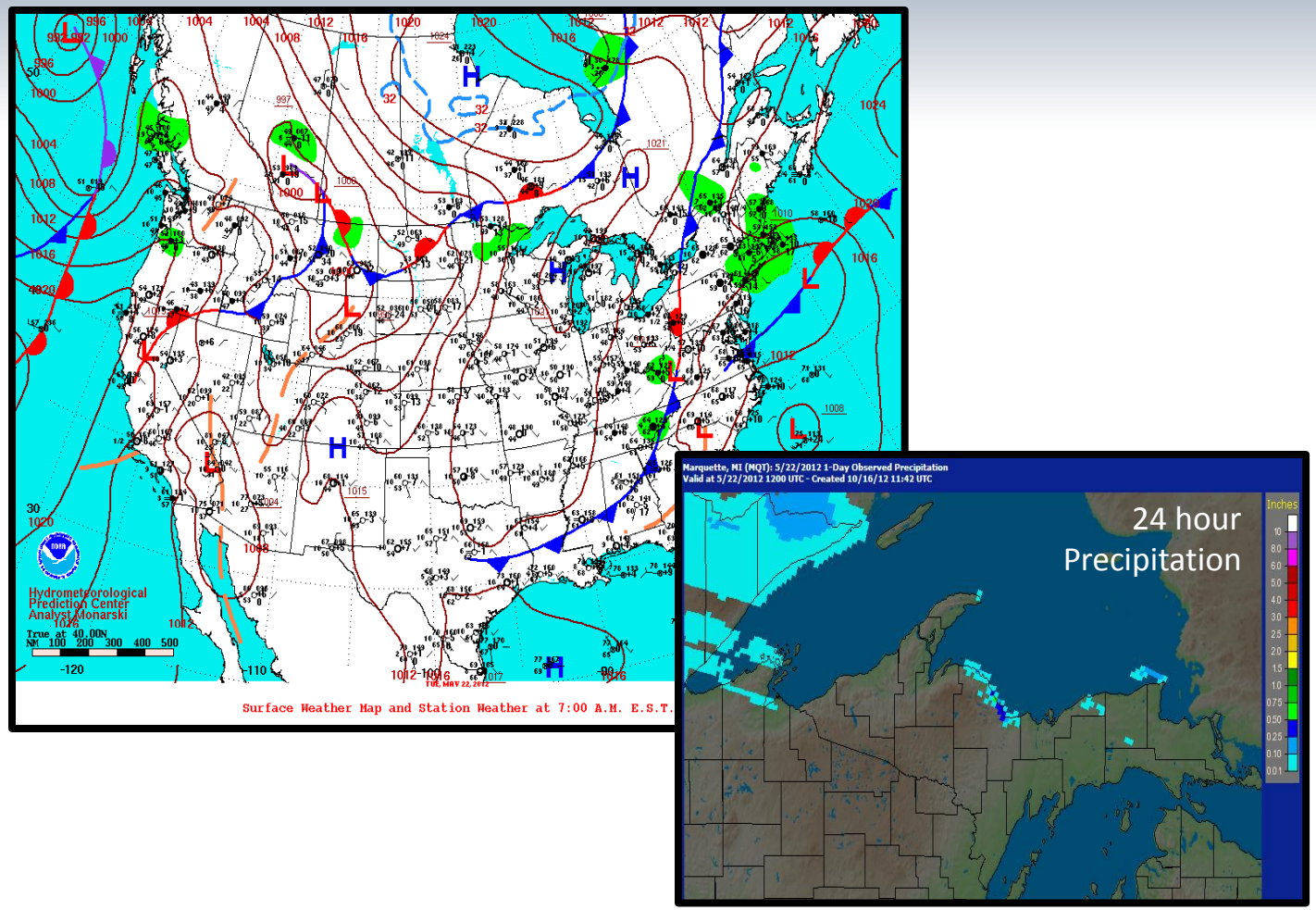


Daily Weather Map



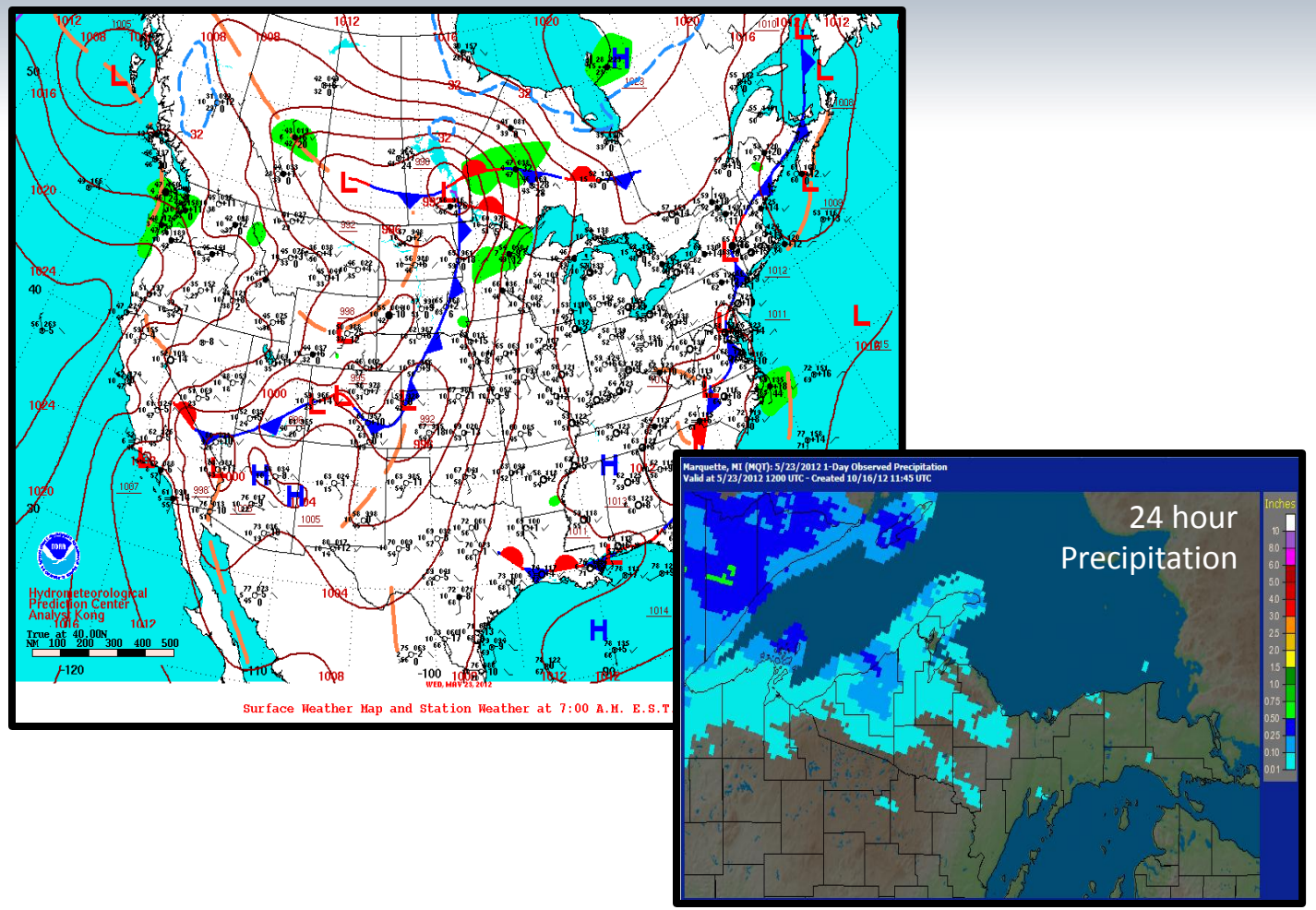
21 May
2012
12z

Daily Weather Map



22 May
2012
12z

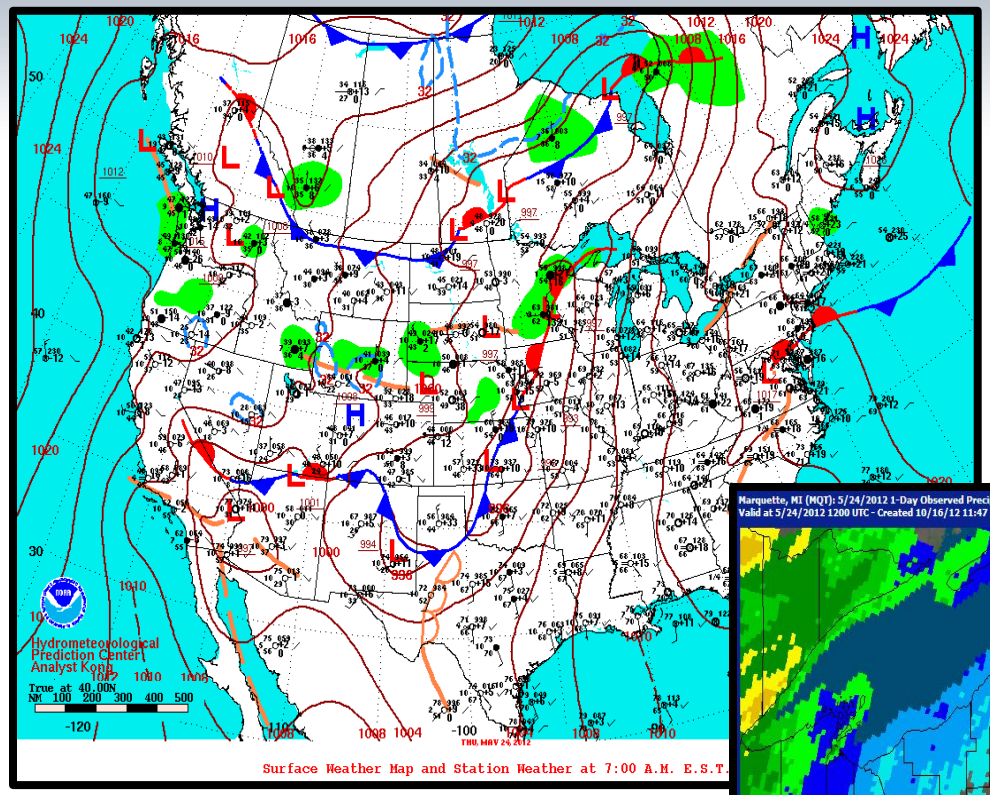
Daily Weather Map

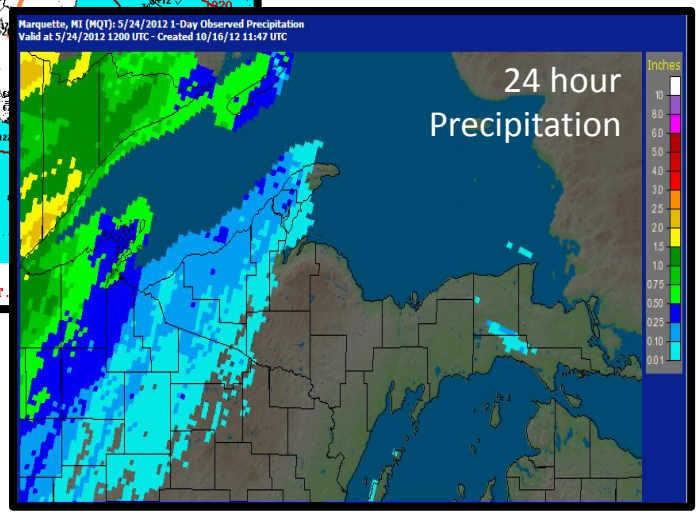


23 May 2012 12z

Daily Weather Map

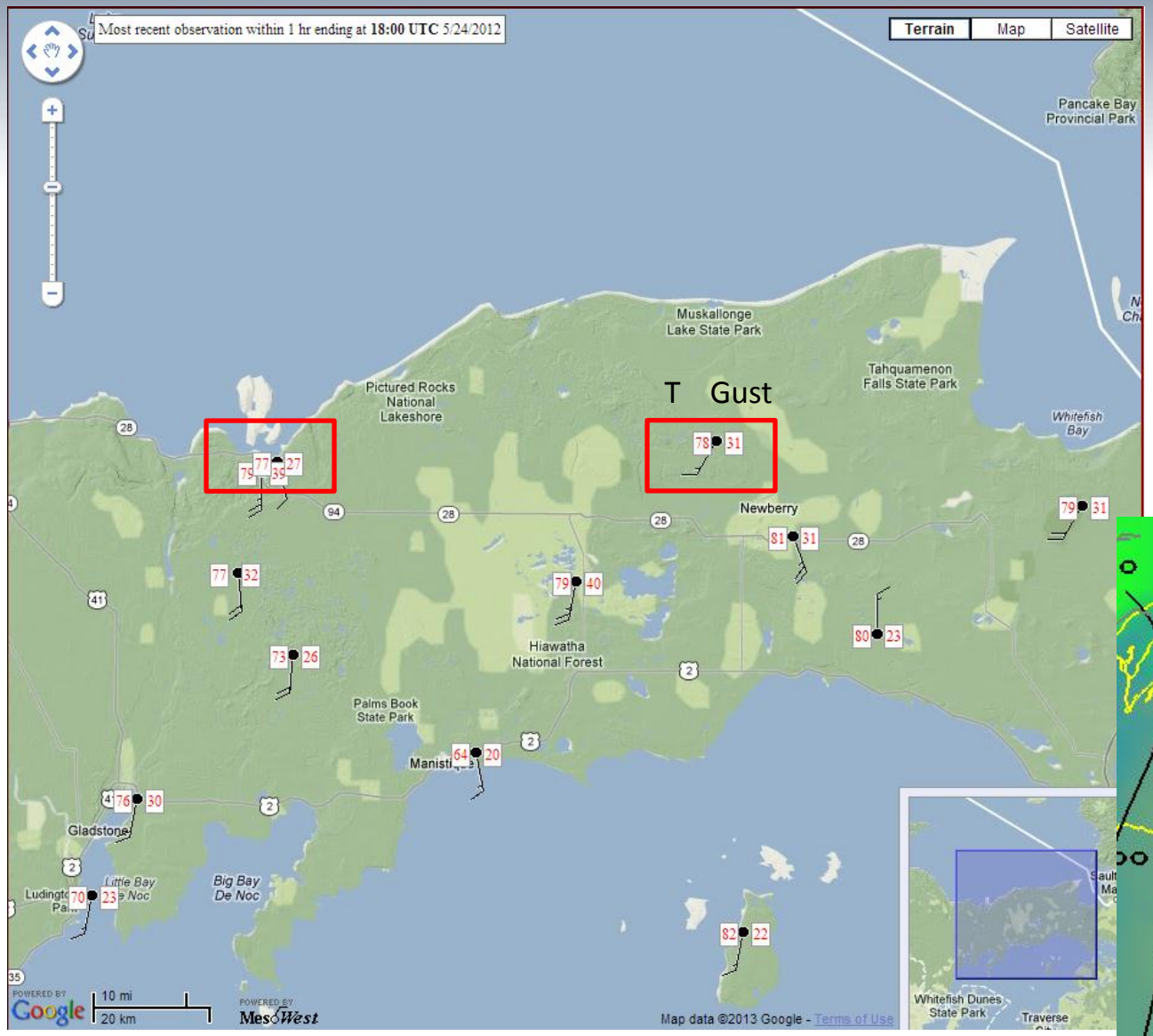
Day of Duck Lake "Fire Start"



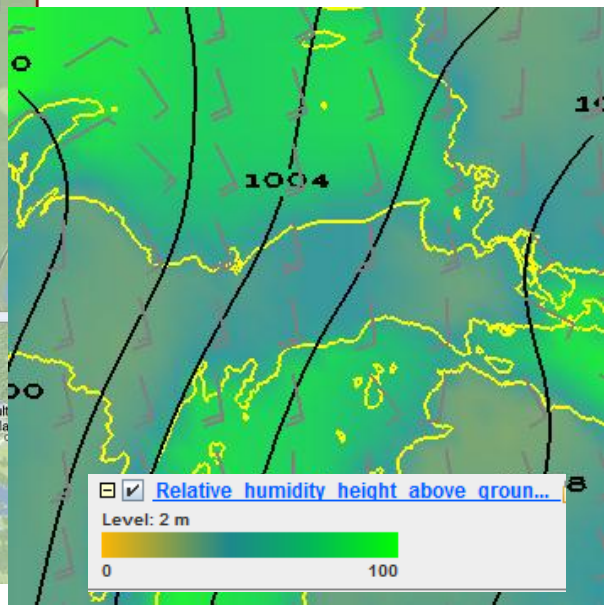


24 May
2012
12z

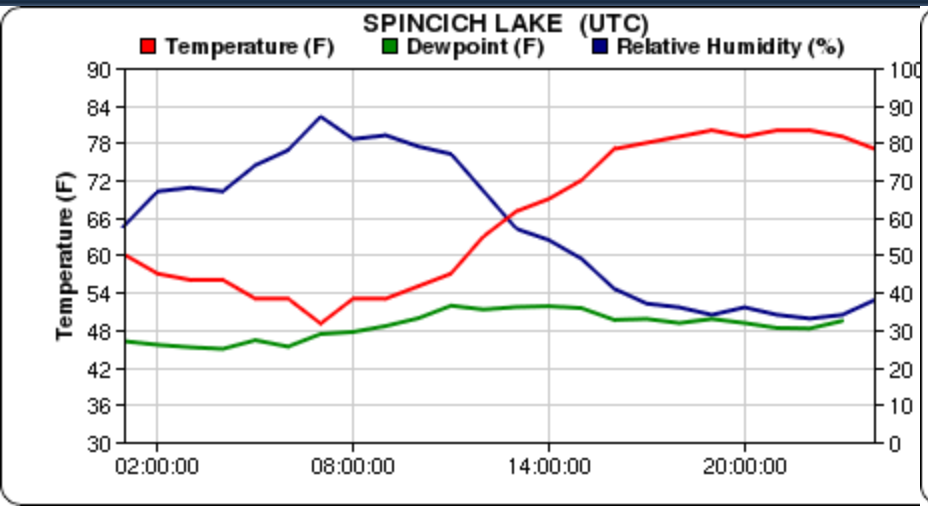
24/18z Observations

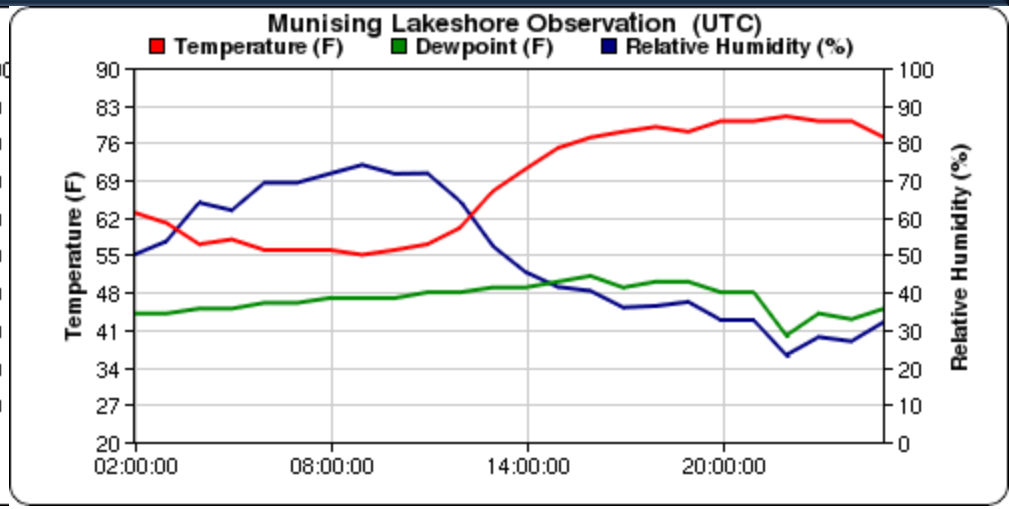


Note the wind gusts of 30 kt or greater and RH values of 30-40%



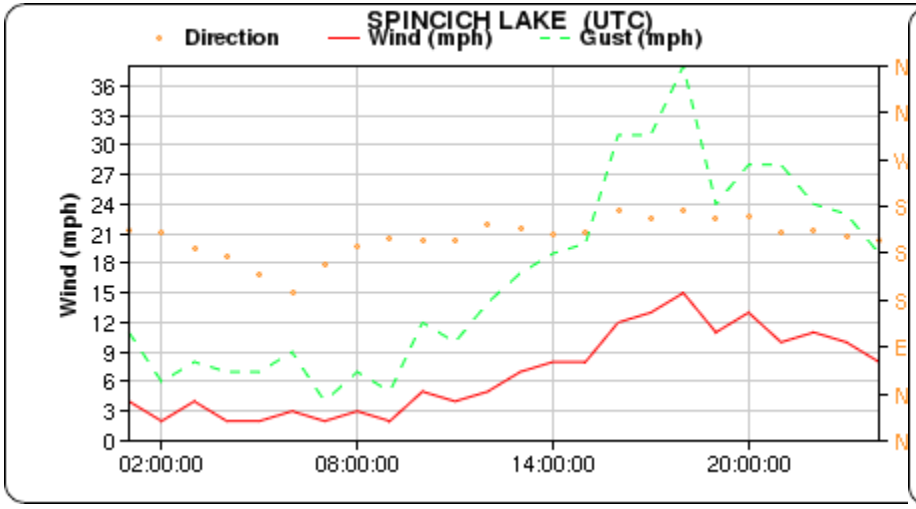
Observations on 5/24

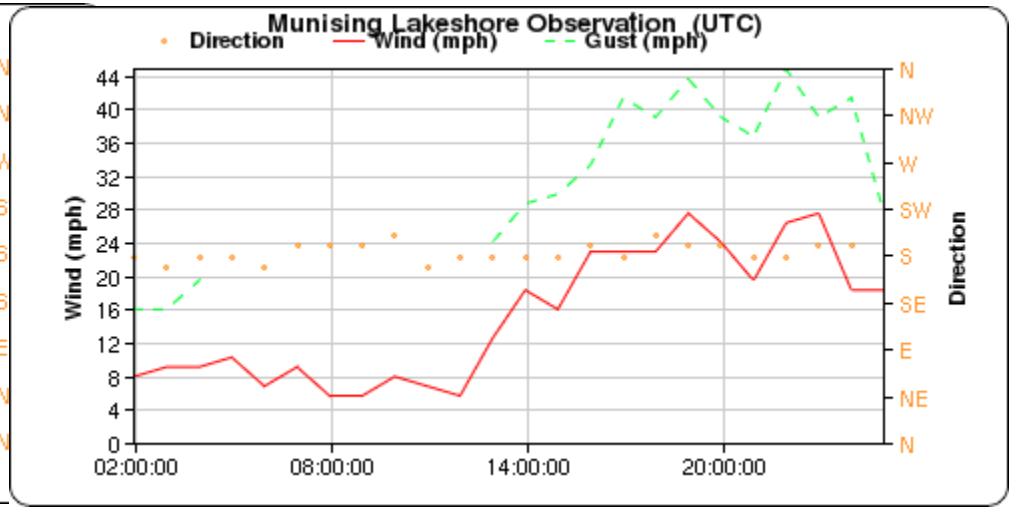




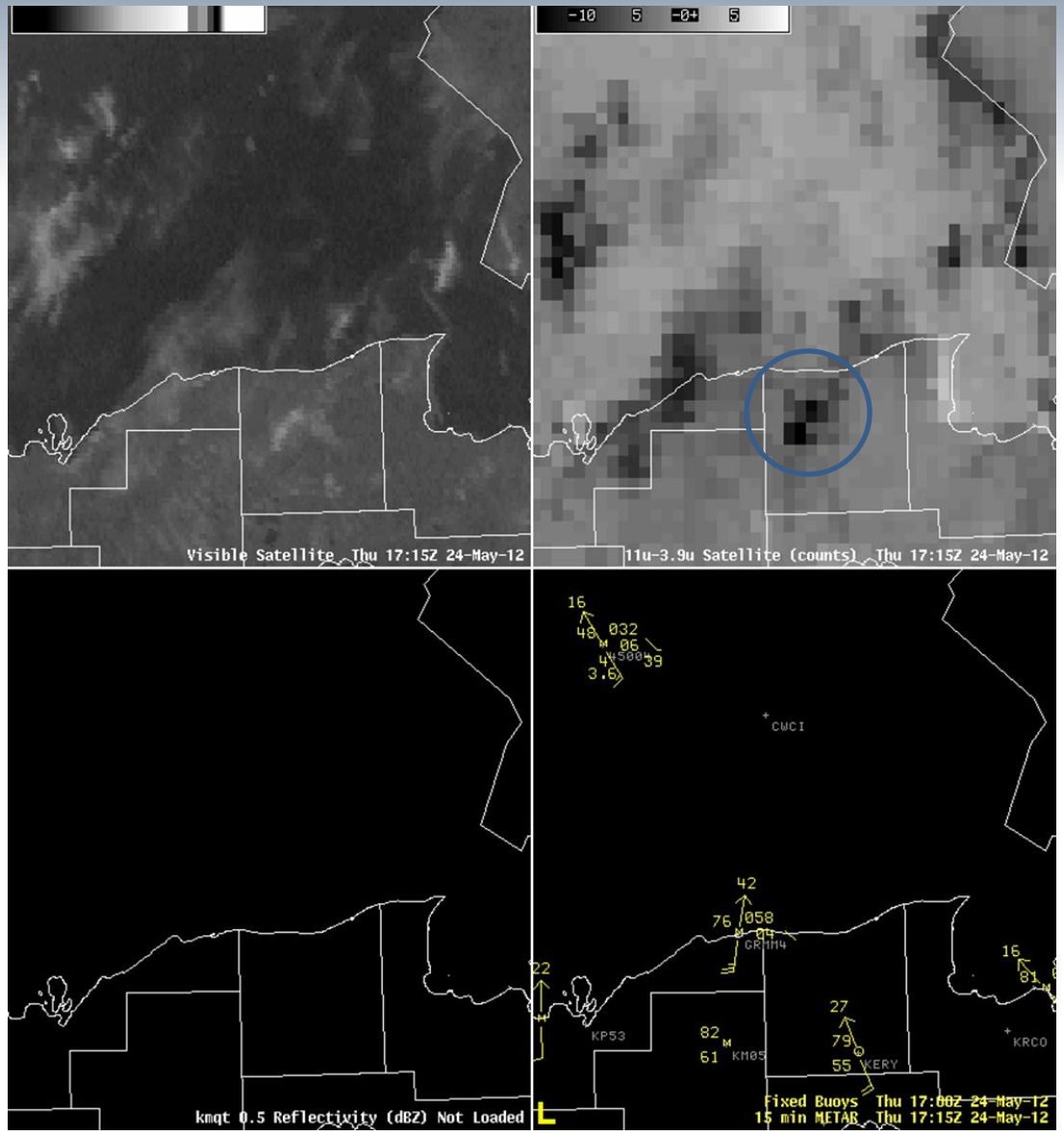
Spincich Lake RAWS

Munising Lakeshore

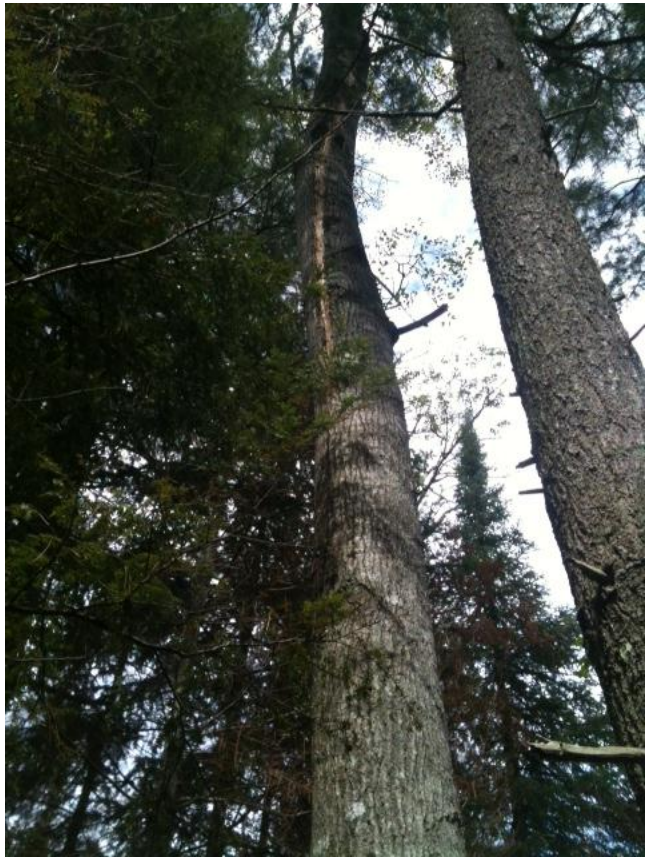




Initial Satellite Clue of the Fire

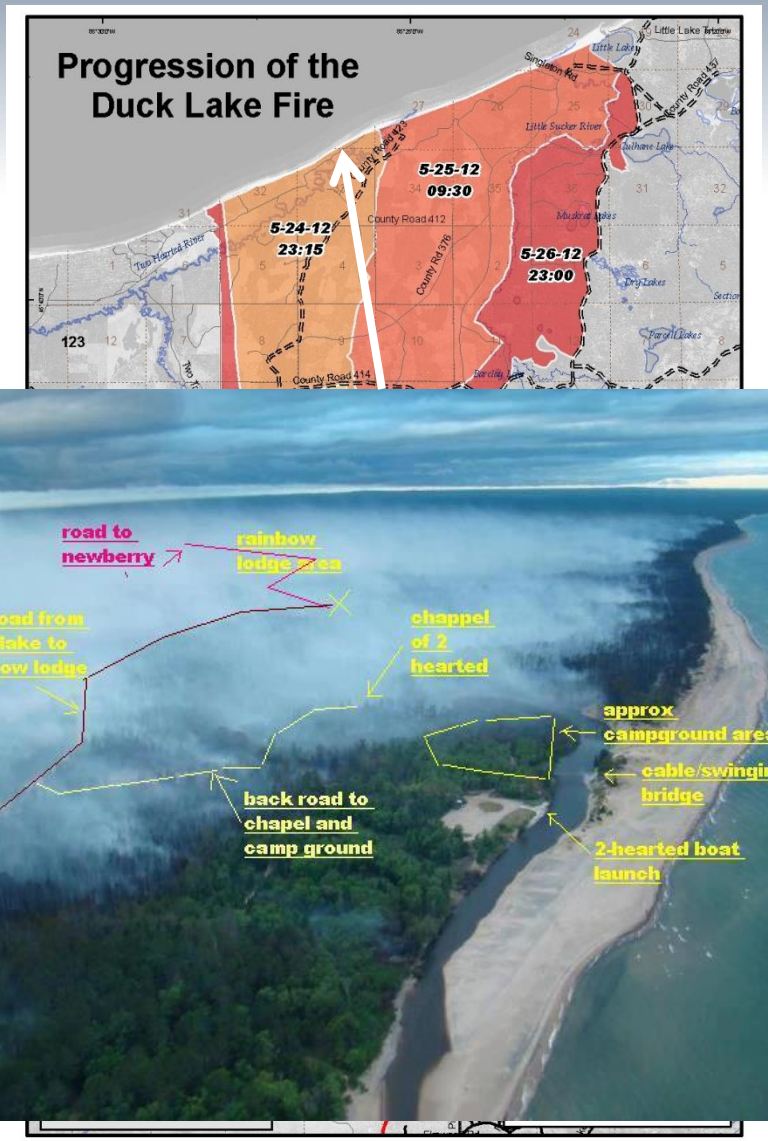


Note the dark spot on the 11u-3.9u Satellite Image



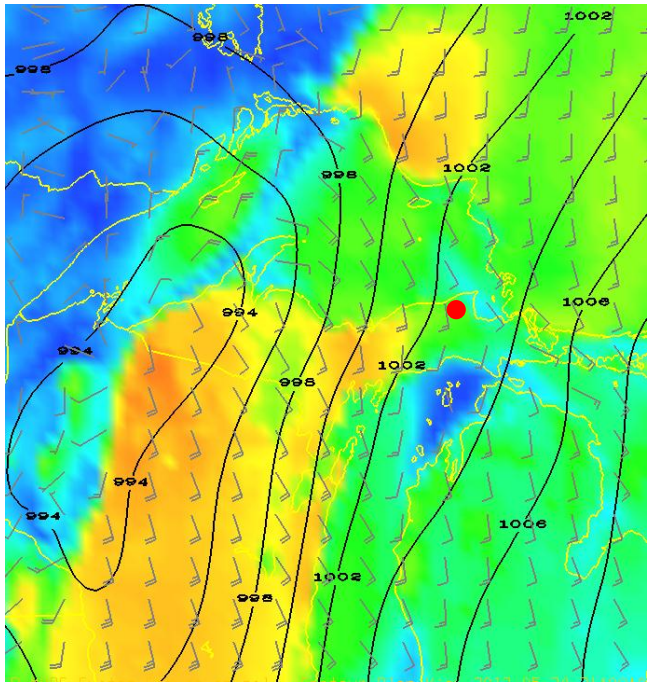
Most Likely Ignition Source

Progression of the Duck Lake Fire



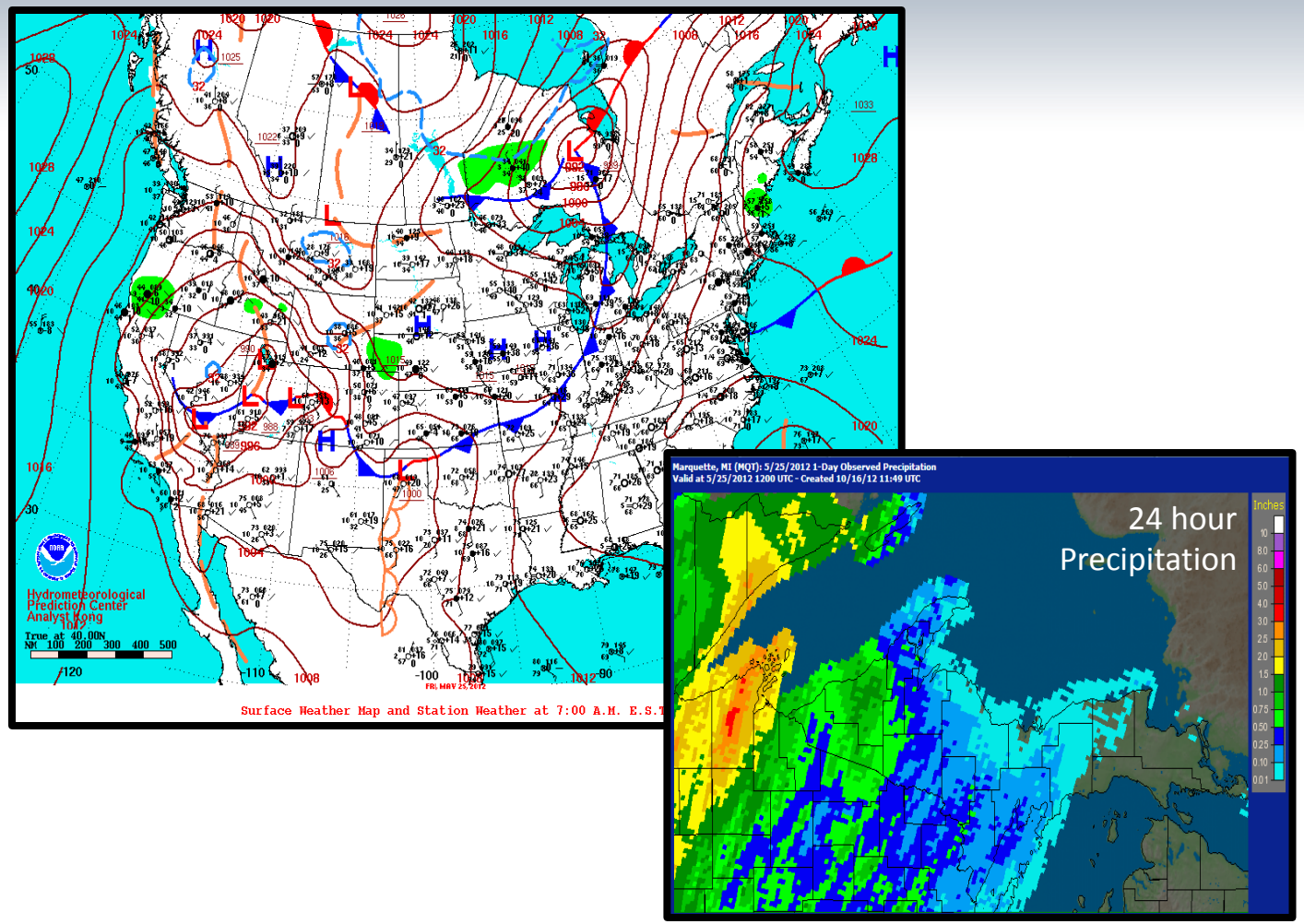
- South Winds gusting to 35 mph helped to allow the fire to rapidly progress northward on the 24th.

- The fire ran nearly 17 km in 18 hrs!
  - Stopped northward progression only due to Lake Superior



24/21z RAP Wind, Wind Gust, SLP

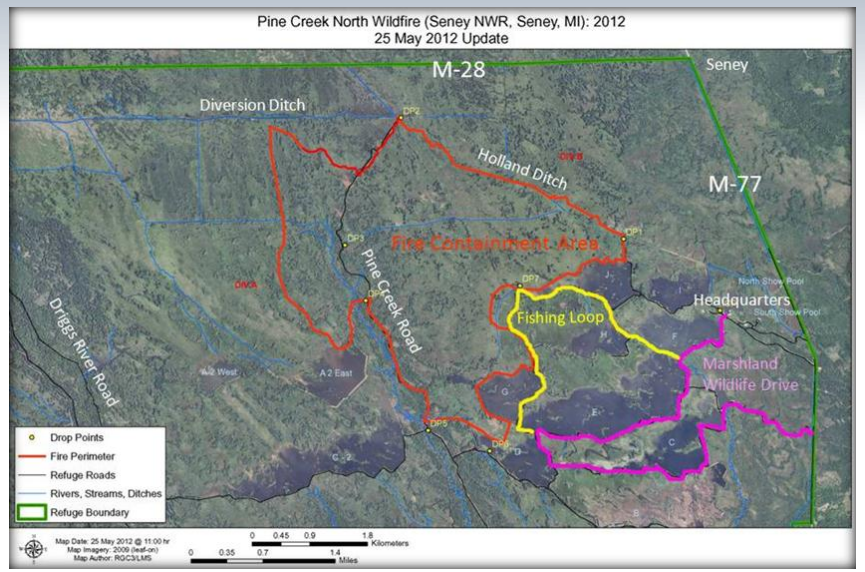
Daily Weather Map

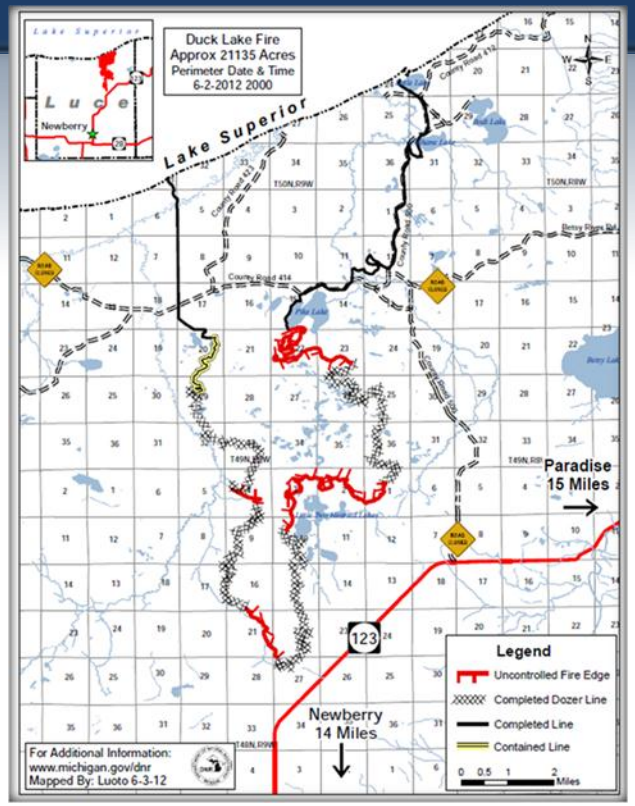


25 May 2012 12z

MODIS False Color Image

25 May approx. 18z





Decision Support from NOAA/NWS Marquette Provided to the Duck Lake Fire Officials

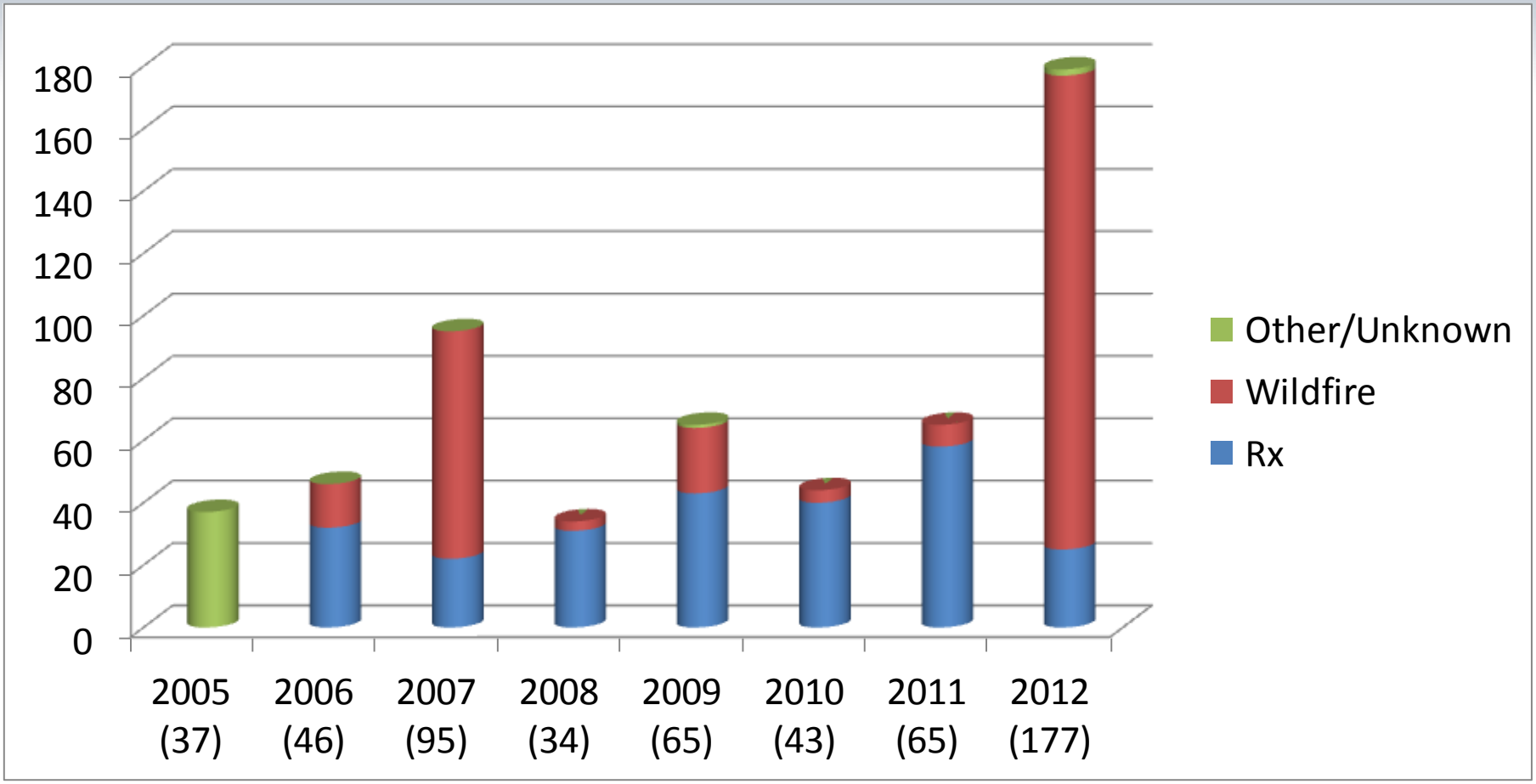
DSS Highlights

- Numerous statements, etc. regarding the potential dry and warm weather issued well in advance
- Integrated User Conference Calls
- Detailed Spot Forecasts (up to 10 per day at times)
- State EOC conference calls
- Decision Support Web Portal on WFO MQT web page

Spot Forecast Details for Duck Lake

- Spot Forecasts were given for 3 locations on the fire (head, tail and middle), twice daily
  - This detail was needed due to the proximity of the fire to Lake Superior (lake breezes, marine layer, etc.)
  - Allowed us to quickly give the planning section detailed information across the entire fire zone
  - These detailed spot forecasts essentially served as an on site IMET
- These detailed spot forecasts continued for 2+ weeks
  - 109 total forecasts issued for this fire

Spot Statistics



User Feedback for Spot Forecasts

6/4/12 Feedback…

These have been a huge help - on the ground weather is confirming the RH values and temps. this has been great to help predict the warm up trend so we have a better idea of when the fuels are going to start flaring up again.

Thank you, J. Burnham, Planning Section Chief Trainee

Spot Forecast Examples

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SPOT FORECAST FOR WIDGEON CREEK - TAIL OF FIRE..MI DNR
NATIONAL WEATHER SERVICE MARQUETTE MI
623 AM EDT SAT MAY 26 2012

FORECAST IS BASED ON REQUEST TIME OF 0533 EDT ON MAY 26
IF CONDITIONS BECOME UNREPRESENTATIVE...CONTACT THE NAT
SERVICE.

.DISCUSSION...LIGHTER WINDS ARE EXPECTED AT THE DUCK LA
TODAY AS HIGH PRESSURE SLIDES ACROSS ONTARIO. SUSTAINEI
WINDS WILL BE UP TO 10 MPH WITH GUSTS POSSIBLY AS HIGH
DIRECTION MAY VARY SIGNIFICANTLY FROM THE HEAD TO THE T
AS THE LAKE BREEZE OFF OF LAKE SUPERIOR TRIES TO PUSH I
THE MEETING OF THE LAKE SUPERIOR AND LAKE MICHIGAN LAKE
IN THE VICINITY OF THE TAIL OF THE FIRE. TEMPERATURES W
WITH AREAS NEAR THE HEAD OF THE FIRE STAYING MAINLY IN
TEMPERATURES TOWARD THE TAIL OF THE FIRE AND M-123 REAC
70S. RESULTING HUMIDITIES WILL VARY AT THE FIRE SITE FR
PERCENT AT THE HEAD OF THE FIRE TO AS LOW AS 30 PERCENT
THE TAIL OF THE FIRE.

EXPECT SCATTERED MID TO HIGH CLOUDS THROUGH MOST OF THE
INCREASE LATE THIS AFTERNOON AND INTO THIS EVENING. THE
RAIN WILL NOT ARRIVE UNTIL TOWARD 0500 EARLY SUNDAY MOR
STEADY RAIN IT WILL NOT LAST LONG...EXITING THE AREA AF
MORNING. EXPECT SKIES TO PARTIALLY CLEAR LATER SUNDAY A
TEMPERATURES WARMING INTO THE UPPER 70S TO NEAR 80 DEGR
SUNSHINE OCCURS. IT WILL BE MORE HUMID WITH HUMIDITY VA
AFTERNOON STAYING AT OR ABOVE 43 PERCENT. WINDS ON SUNI
FROM THE SOUTHEAST AND REMAIN MAINLY LESS THAN 10 MPH.

.TODAY...

SKY/WEATHER.....PARTLY CLOUDY.
MAX TEMPERATURE....MAX 76.
MIN HUMIDITY.....MIN 34 PERCENT.
GENERAL WINDS.....VARIABLE WINDS 5 MPH OR LESS BECOMI
                  LATE IN THE MORNING...THEN INCREASI
                  EAST 5 TO 10 MPH IN THE AFTERNOON.
HAINES INDEX.....3...OR VERY LOW POTENTIAL FOR LARGE
                  DOMINATED FIRE GROWTH.
TRANSPORT WINDS....SOUTHEAST 1 TO 9 MPH.
VENTILATION INDEX...FAIR (285).
LAL.....1.
MIXING HEIGHT.....300-1200 FT AGL INCREASING TO 5700-
RAINFALL AMOUNT....0.00 INCHES.

TIME (EDT)      8AM 9AM 10A 11A 12P 1PM 2PM 3PM 4PM 5PM
SKY (%).....28  28  28  27  27  27  27  31  36  41
WEATHER COV.....
WEATHER TYPE....
TEMP.....45  52  60  66  71  73  74  74  75  74
RH.....90  71  54  44  37  36  36  35  34  34
GENERAL WIND DIR..SW  SW  SW  SE  SE  SE  NE  NE  NE  N
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SPOT FORECAST FOR DUCK LAKE - HEAD OF FIRE..MI DNR
NATIONAL WEATHER SERVICE MARQUETTE MI
627 AM EDT SAT MAY 26 2012

FORECAST IS BASED ON REQUEST TIME OF 0535 EDT ON MAY 26.
IF CONDITIONS BECOME UNREPRESENTATIVE...CONTACT THE NATION
SERVICE.

.DISCUSSION...LIGHTER WINDS ARE EXPECTED AT THE DUCK LAKE
TODAY AS HIGH PRESSURE SLIDES ACROSS ONTARIO. SUSTAINED GE
WINDS WILL BE UP TO 10 MPH WITH GUSTS POSSIBLY AS HIGH AS
DIRECTION MAY VARY SIGNIFICANTLY FROM THE HEAD TO THE TAI
AS THE LAKE BREEZE OFF OF LAKE SUPERIOR TRIES TO PUSH INLA
THE MEETING OF THE LAKE SUPERIOR AND LAKE MICHIGAN LAKE BR
IN THE VICINITY OF THE TAIL OF THE FIRE. TEMPERATURES WILL
WITH AREAS NEAR THE HEAD OF THE FIRE STAYING MAINLY IN THE
TEMPERATURES TOWARD THE TAIL OF THE FIRE AND M-123 REACH T
70S. RESULTING HUMIDITIES WILL VARY AT THE FIRE SITE FROM
PERCENT AT THE HEAD OF THE FIRE TO AS LOW AS 30 PERCENT IN
THE TAIL OF THE FIRE.

EXPECT SCATTERED MID TO HIGH CLOUDS THROUGH MOST OF THE DA
INCREASE LATE THIS AFTERNOON AND INTO THIS EVENING. THE GR
RAIN WILL NOT ARRIVE UNTIL TOWARD 0500 EARLY SUNDAY MORNIN
STEADY RAIN IT WILL NOT LAST LONG...EXITING THE AREA AFTER
MORNING. EXPECT SKIES TO PARTIALLY CLEAR LATER SUNDAY AFTE
TEMPERATURES WARMING INTO THE UPPER 70S TO NEAR 80 DEGREES
SUNSHINE OCCURS. IT WILL BE MORE HUMID WITH HUMIDITY VALUE
AFTERNOON STAYING AT OR ABOVE 43 PERCENT. WINDS ON SUNDAY
FROM THE SOUTHEAST AND REMAIN MAINLY LESS THAN 10 MPH.

.TODAY...

SKY/WEATHER.....PARTLY CLOUDY.
MAX TEMPERATURE....MAX 64.
MIN HUMIDITY.....MIN 50 PERCENT.
GENERAL WINDS.....VARIABLE WINDS 5 MPH OR LESS BECOMING
                  4 TO 9 MPH LATE IN THE MORNING...THEN
                  INCREASING TO 6 TO 11 MPH IN THE AFTER
HAINES INDEX.....3...OR VERY LOW POTENTIAL FOR LARGE PL
                  DOMINATED FIRE GROWTH.
TRANSPORT WINDS....SOUTHEAST 8 MPH OR LESS.
VENTILATION INDEX...POOR (42).
LAL.....1.
MIXING HEIGHT.....300-1400 FT AGL.
RAINFALL AMOUNT....0.00 INCHES.

TIME (EDT)      8AM 9AM 10A 11A 12P 1PM 2PM 3PM 4PM 5PM 6P
SKY (%).....29  28  28  27  26  25  25  31  37  43  49
WEATHER COV.....
WEATHER TYPE....
TEMP.....44  49  54  58  61  62  63  63  63  63  63
RH.....91  80  68  61  55  54  54  53  51  51  50
GENERAL WIND DIR..W   W   W   NE  NE  NE  NE  NE  NE  NE
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SPOT FORECAST FOR DUCK LAKE - MIDDLE OF FIRE..MI DNR
NATIONAL WEATHER SERVICE MARQUETTE MI
630 AM EDT SAT MAY 26 2012

FORECAST IS BASED ON REQUEST TIME OF 0536 EDT ON MAY 26.
IF CONDITIONS BECOME UNREPRESENTATIVE...CONTACT THE NATIONAL WEATHER
SERVICE.

.DISCUSSION...LIGHTER WINDS ARE EXPECTED AT THE DUCK LAKE FIRE SITE
TODAY AS HIGH PRESSURE SLIDES ACROSS ONTARIO. SUSTAINED GENERAL
WINDS WILL BE UP TO 10 MPH WITH GUSTS POSSIBLY AS HIGH AS 18 MPH. WIND
DIRECTION MAY VARY SIGNIFICANTLY FROM THE HEAD TO THE TAIL OF THE FIRE
AS THE LAKE BREEZE OFF OF LAKE SUPERIOR TRIES TO PUSH INLAND. WE EXPECT
THE MEETING OF THE LAKE SUPERIOR AND LAKE MICHIGAN LAKE BREEZES TO BE
IN THE VICINITY OF THE TAIL OF THE FIRE. TEMPERATURES WILL VARY AS WELL
WITH AREAS NEAR THE HEAD OF THE FIRE STAYING MAINLY IN THE 60S WHILE
TEMPERATURES TOWARD THE TAIL OF THE FIRE AND M-123 REACH THE MIDDLE
70S. RESULTING HUMIDITIES WILL VARY AT THE FIRE SITE FROM AROUND 50
PERCENT AT THE HEAD OF THE FIRE TO AS LOW AS 30 PERCENT INLAND AROUND
THE TAIL OF THE FIRE.

EXPECT SCATTERED MID TO HIGH CLOUDS THROUGH MOST OF THE DAY. CLOUDS WILL
INCREASE LATE THIS AFTERNOON AND INTO THIS EVENING. THE GREATEST CHANCES OF
RAIN WILL NOT ARRIVE UNTIL TOWARD 0500 EARLY SUNDAY MORNING. IF THERE IS
STEADY RAIN IT WILL NOT LAST LONG...EXITING THE AREA AFTER 1000 ON SUNDAY
MORNING. EXPECT SKIES TO PARTIALLY CLEAR LATER SUNDAY AFTERNOON WITH
TEMPERATURES WARMING INTO THE UPPER 70S TO NEAR 80 DEGREES IF ENOUGH
SUNSHINE OCCURS. IT WILL BE MORE HUMID WITH HUMIDITY VALUES SUNDAY
AFTERNOON STAYING AT OR ABOVE 43 PERCENT. WINDS ON SUNDAY WILL STAY
FROM THE SOUTHEAST AND REMAIN MAINLY LESS THAN 10 MPH.

.TODAY...

SKY/WEATHER.....PARTLY CLOUDY.
MAX TEMPERATURE....MAX 66.
MIN HUMIDITY.....MIN 47 PERCENT.
GENERAL WINDS.....VARIABLE WINDS 5 MPH OR LESS BECOMING NORTH 4
                  TO 9 MPH LATE IN THE MORNING...THEN SHIFTING TO
                  THE NORTHEAST 6 TO 11 MPH IN THE AFTERNOON.
HAINES INDEX.....3...OR VERY LOW POTENTIAL FOR LARGE PLUME
                  DOMINATED FIRE GROWTH.
TRANSPORT WINDS....SOUTHEAST 8 MPH OR LESS.
VENTILATION INDEX...POOR (65).
MIXING HEIGHT.....300-2200 FT AGL.
RAINFALL AMOUNT....0.00 INCHES.

TIME (EDT)      8AM 9AM 10A 11A 12P 1PM 2PM 3PM 4PM 5PM 6PM 7PM
SKY (%).....29  28  28  27  26  26  25  31  37  43  49  55
WEATHER COV.....
WEATHER TYPE....
TEMP.....45  49  55  59  63  64  64  65  65  65  65  64
RH.....89  78  66  58  52  51  52  50  48  48  47  49
GENERAL WIND DIR..W   W   W   N   N   N   NE  NE  NE  NE  NE  NE
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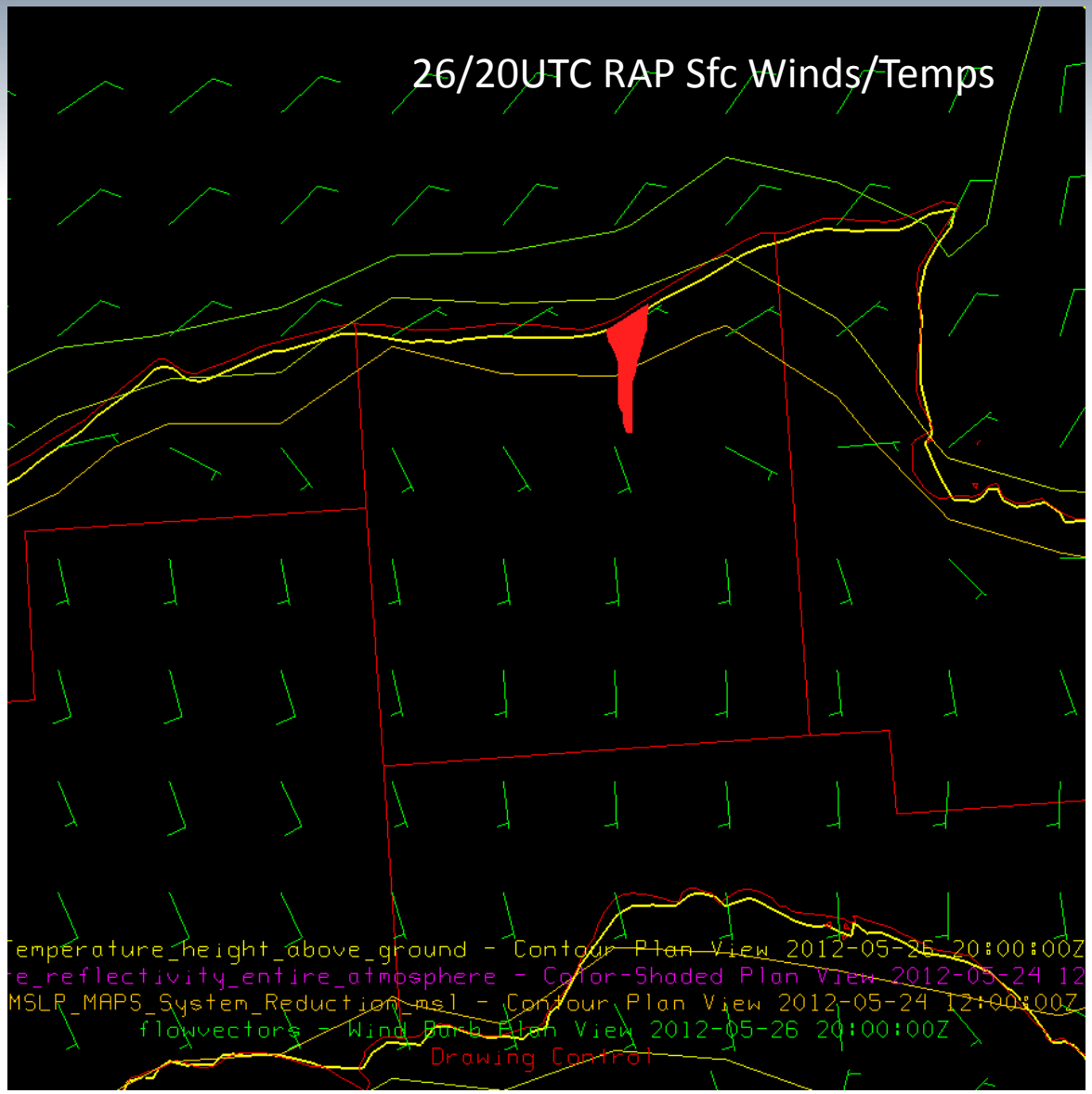
Why the 3 spots were critical

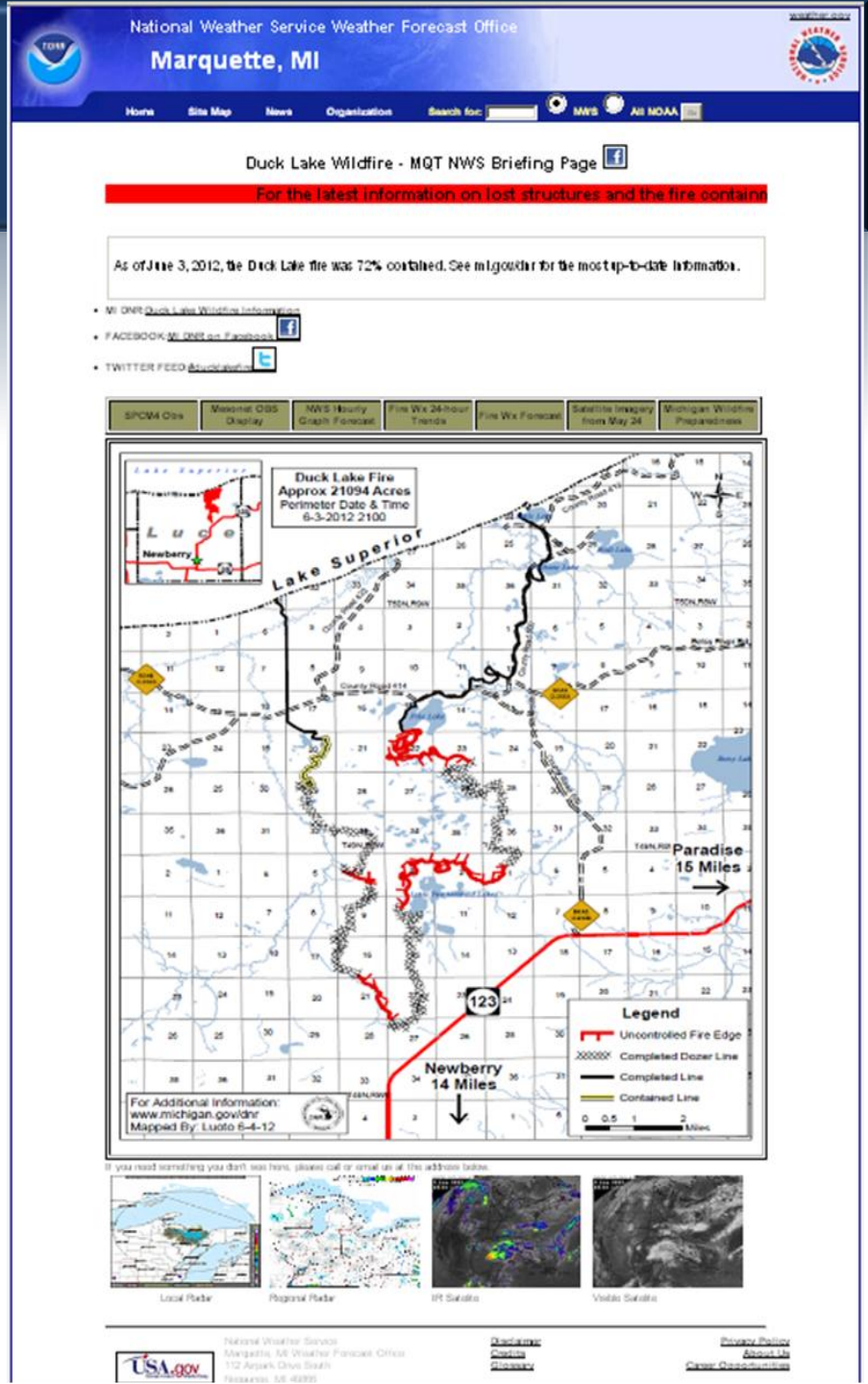


- Lake Breeze Boundaries frequently intersected the site
- Local High Resolution modeling was also done to assist the forecast

DSS Page

- Initially pre-worked for Seney Pine Creek Wildfire 24 May
- Became Duck Lake and posted 25 May
- **Became a place for the public to get the latest information on the fire**
- Placed up to date maps, information, weather, etc. on the page.
- Also put social media links for MI DNR, etc.

http://www.crh.noaa.gov/mqt/?n=dss_hazards



Other more traditional DSS…

- Wildfire Potential Statements issued May 18, 19, 23, 24, and 25
  - No Red Flag Warning needed since our criteria was never met (RH)
- Morning conference call initiated by NWS on May 23
  - Discussed strong winds and relatively low RH
- Traditional call occurred May 24 (10am)
  - Duck Lake fire had still “not taken off” yet
  - Continued to brief on strong winds and relatively low RH

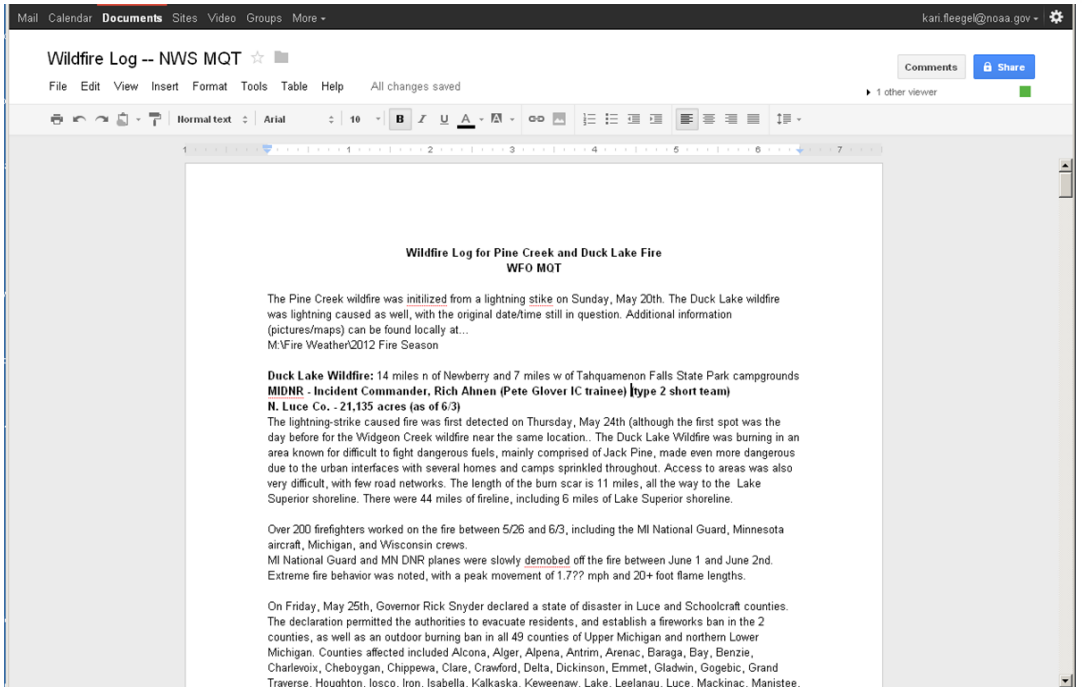
NWS Marquette Best Practice and Findings

What we did well, and what we can do better…

Best Practice 1
Use of Google Docs

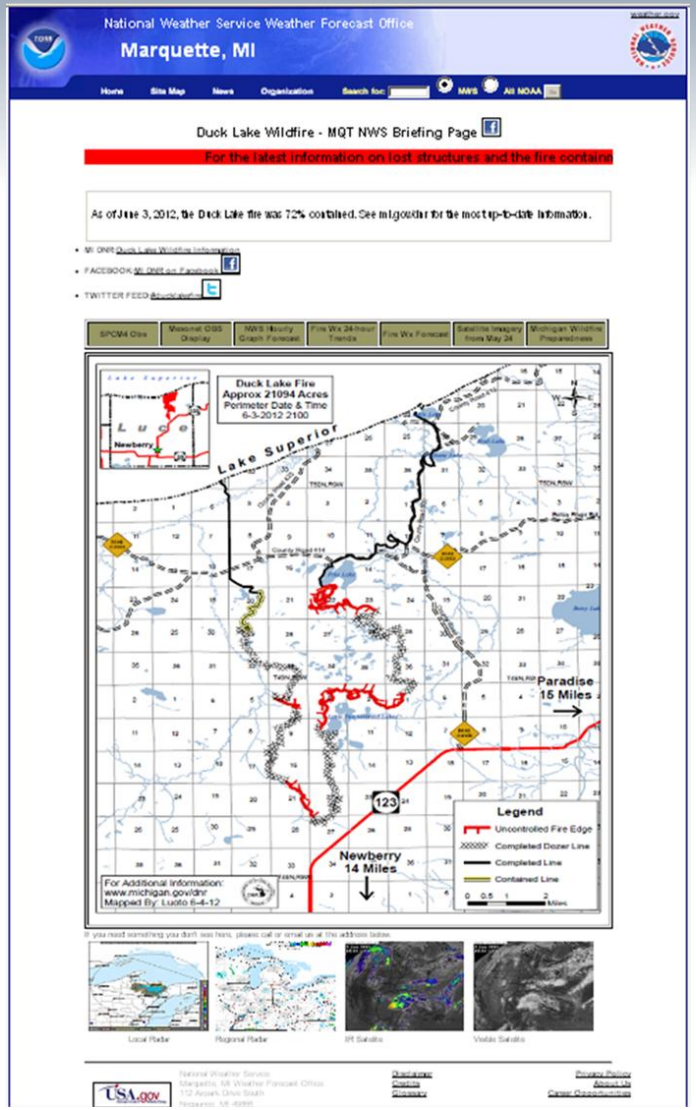
The use of Google Docs was an excellent way to keep a complete log of our actions during the fire at one central location.

Allowed for this to be shared with anyone, and be edited by anyone we wanted.



Best Practice 2
DSS Page

- The DSS page created by the NWS Marquette office provided important and timely information for the public.
- Numerous people commented on this being an excellent source for information.
- Sub finding – did not release any information before it was released to public



Best Practice 3
Relationship with fire partners

- The years of communication and collaboration with our fire partners and customers allowed both sides to “trust each other” throughout the entire fire.
  - When the SOO first noticed the fire on satellite, he immediately called the MI DNR Ops notifying them on the hot spot on satellite.
  - They already were aware and were extremely busy.
  - We simply asked if they needed a SPOT forecast, and without hesitation they said yes and to “just do the spot close to where the satellite spot was located”

Best Practice 4
Spot Forecasts

- As noted in earlier slides, the spot forecasts for the three areas on the fire (head, tail, middle) were very valuable to the planning section.
  - Due to proximity to the lake, these spots would allow us to forecasting timing, proximity, etc of lake breeze and lake influences.
- This also allowed resources (i.e. $$) to be saved from not deploying an IMET to the fire.

Finding 1
Communications with the Fire

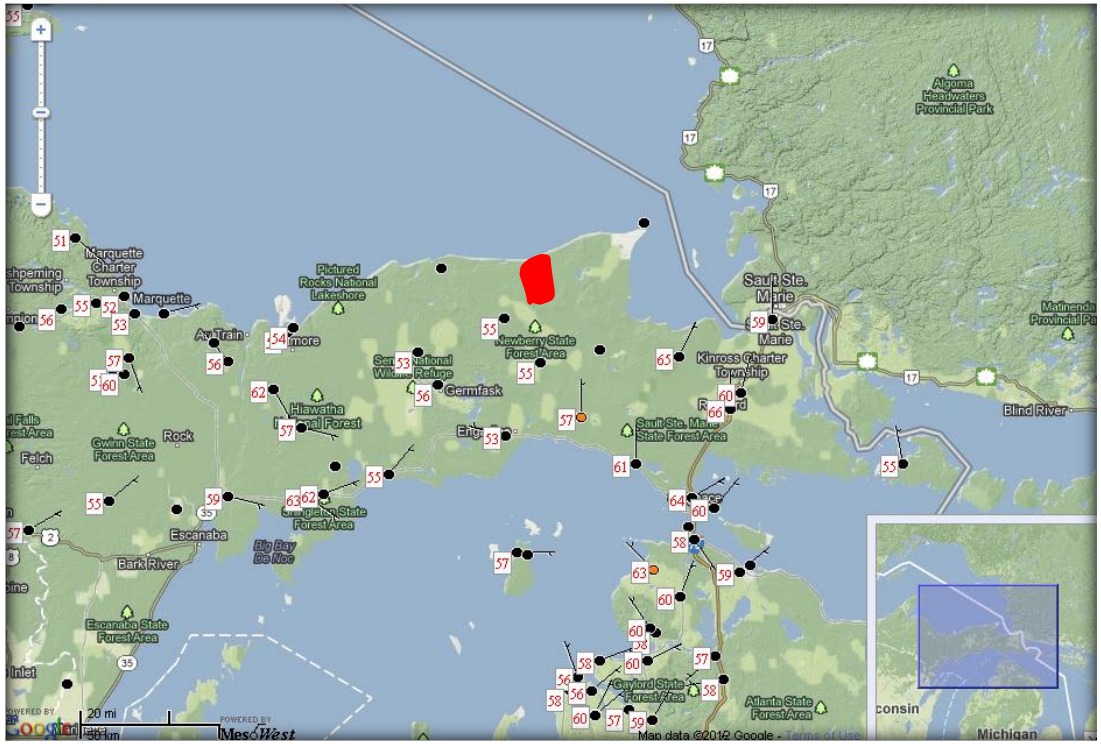
- Although our communications were excellent with the DNR officials, communication with the fire officials (i.e. Planning Chief, etc.) proved difficult at times.
- Important to know who the main point of contact was at all times
  - We did not always know this
- We needed to rely on 800 mHZ radio better
- We also needed to relay critical near term weather information better (i.e. thunderstorms nearby, wind shifts, etc.)

Finding 2
Forecaster roles/consistency

- To allow for better forecast day to day forecast consistency, we attempted to keep the same several forecasters devoted to fire DSS duties.
- We found that keeping 1 person per shift focusing on IDSS/Fire Weather activities allows for a consistent message
  - This person needed to be identified at shift change

Finding 3 – Observations near the fire limited

- Closest observation was Spincich Lake RAWS (approx. 30 km away).
- Although terrain is not a huge issue in this area, it did not pick up on the Lake Breeze activity that was so important to fire officials (and to our forecast)
- A portable RAWS unit deployed to the fire would have been beneficial



Thank You!

Further comments and questions?

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